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CONTROL OF WATER POWERS.

Much discussion has taken place during recent years regarding the control of water powers which are located within the boundaries of the national forests or other districts over which the Federal Government still has control. Partisans for one side claim that the Federal Government should retain as complete control as its present powers permit it to exercise, while others demand that entire control over such matters, so far as they are not connected with navigable streams, should be turned over to the respective states within whose boundaries the water powers exist. While these discussions have been going on as to where authority should reside, the state and federal officials have been seeking a solution of the problem through co-operation in their administration. The Secretary of Agriculture has already made agreements with the State Water Commissions of two of the Pacific States whereby there shall be no clash in authority, but federal and state officials act in harmony, each keeping the other informed of any action taken and refraining from taking any action which would conflict with the regulations and policies of the other. Development of water powers within the limits of the national forests cannot be undertaken without a permit from the district forester, and state laws in several of the states also provide for authority from state officials before water can be diverted from any stream for private use. Under the agreement above mentioned, neither official will grant a permit unless the sanction of the other is also obtained in the case, where both are involved.

The matter is brought to attention by the endeavor of one of the hydroelectric companies in California to utilize certain water powers in the Inyo National Forest. The State Water Commission regarded such utilization as contrary to public interest, and although the United States forester has legal power to permit such development to take place, he declines to do so under such circumstances and has been upheld by the Secretary of Agriculture in this attitude. In taking this position the federal officials do not relinquish any federal rights or authority in the matter, but take the position of choosing to exercise such authority as is vested in them in conformity with the policy of the state officials. Such an attitude upon the part of the federal administration should satisfy those who have been clamoring for the federal government to turn the matter entirely over to the individual states.

REFUNDING BOND ISSUES.

The decision of the Appellate Division of the Supreme Court of New York State, referred to in last week's issue, is of great importance to utility companies. This case arose from the appeal against the decision of the Public Service Commission of the First District in regard to the issue of bonds for refunding a previous issue which is about to mature. The court held that the Commission has the same supervision over such issues as over those issued at the time of contracting the debt.

The reason this case came up to the court for decision is because the Commission refused to approve of the issue until it was satisfied that the debt was represented by property of value or cost equal to the face value of the bonds, or that the obligations to be refunded were represented in capital account. The contention of the company that it was entitled as a matter of course to the consent of the Commission to the new issue merely because the outstanding obligations were valid is not sustained by the court.

This decision upholds the idea which was intended to be made effective when the Commission was given control over issue of securities. This idea is that the public may at least feel secure when investing in such an issue of bonds that the funds thereby represented have been actually used as capital and are represented by definite investments in permanent property, rather than disbursements for operating expenses or other temporary purposes. The Commission, however, is not permitted to apply to the issue of such securities, tests as to whether the present value of the company's property or its present earning capacity are suitably related to the face value of the securities issued. The utility company is required, however, to satisfy the Commission regarding the other points mentioned and the fact that the obligations were originally incurred before the public utility law went into effect have no bearing upon the situation.

PUTTING THE INVENTOR TO WORK.

Announcement is made that in response to an invitation from Secretary of the Navy Daniels, Mr. Thomas A. Edison has consented to head an advisory department on behalf of the Government. As we understand it, Secretary Daniels has evolved the idea that there should be a bureau of information and advice co-operating with the Administration with a view to having the best inventive talent in the United States suggesting methods for improving governmental agencies of attack and defense.

If the idea is developed Mr. Edison will undoubtedly have for associates in such a council many inventors whose names are illustrious through actual achievement. The motives underlying their effort are to be entirely patriotic, and the glory attending the effort is to be their only recompense.

Such a council could and would advise in splendid fashion and develop to the limit many ideas not now given an opportunity for demonstration. Their genius, however, must have direction, and the development of their ideas must be attended with faith and an open mind as regards expenditures. The success of invention lies as much in the effort that is put behind its development to a stage of practical usefulness, as it does in its apparent availability in original form.

POWERS OF STATE UTILITY COMMISSIONS.

In a few of the states the state utility commissions receive their powers from the state constitution, but in most of the states the powers of the state commission are granted by statutes and are a delegation of the powers which already reside in the legislature. In other words, in creating a utility commission to carry out the usual functions, the legislature is transferring to it powers which it already holds in its own hands. Such powers can, of course, be withdrawn at any time and are subject to any restrictions which future legislatures may choose to exercise.

The intent of most legislatures in creating utility commissions has been to exercise powers of regulation by a body of men who can give proper study to the subject and to the merits of the particular cases which may come up for action. Such a body can act with greater justice to both the public and the utilities involved than can the legislature itself, and is in a much better position to determine whether rates are reasonable and whether service is furnished as it should be. The delegation of such powers to a commission usually infers an intent upon the part of the legislature to no longer directly exercise such functions itself.

Has a commission created under such circumstances the right and power to repeal action which has already been taken by the state legislature? This question has recently arisen in New York, where a railroad company petitioned the commission for authority to change a rate which had previously been established by a legislative act. What the powers of a particular commission may be in such a case depend entirely, of course, upon the provisions of the specific act by which it was created and given powers. The Public Service Commission for the Second District of New York has decided that it has no power to overrule action previously taken by the State Legislature, although this opinion was not a unanimous one, two of the commissioners dissenting from the majority. A question of this kind, of course, involves the interpretation of the utility act and may eventually involve a decision by the state courts.

It must be evident, however, that the legislative intent in creating a utility commission is to have it pass upon all such matters of rates after due investigation, as it is only by such investigation that reasonableness of any rate can be established. In states where the legislature has not already given the commission power over rates which have been previously determined by statute, such powers should certainly be granted by amendment to the original laws.

RATES FOR ELECTRIC HEATING AND COOKING.

We have referred a number of times in these columns to the fact that there are in England 23 central stations which supply energy for electric heating and cooking at an energy rate of one cent per kilowatt-hour, usually accompanied by some form of a demand charge. The matter is brought to attention once more by a paper presented at the meeting of the Incorporated Municipal Electrical Association held last month, entitled "The Practical Result of the Point-Five Tariff" by Messrs. A. S. Blackman and Thomas Roles, managing engineers of two of the utilities which offer this rate. The paper is of interest principally in demonstrating the possibility of obtaining a load of this character when a suitable rate is offered, the fact that energy can be successfully supplied at such a rate, and that no substantial progress can be made, at least in England, in supplying electric energy for these purposes where the charge per kilowatt-hour exceeds one cent.

In a number of the communities enjoying this rate, the demand charge has been based upon the assessed valuation of the residence served, in conformity with a system originally inaugurated in Norwich. The particular manner of determining this demand charge is, however, of minor importance, as it might readily be based upon the consumer's actual demand where this can be determined, or upon the average demand of the class of consumers involved. As applied in Bradford, for instance, the demand charge is so chosen as to amount practically to bringing the unit charge for lighting up to about eight cents, while the additional current used for heating and cooking is obtained by the consumer for one cent per unit. It is found that consumers' load-factors are remarkably increased when a cooking load is added to the lighting load, and the output of the station is so affected that the additional cost of supplying the additional energy comes well within the price charged. This consideration falls directly in line with a point of view adopted by most American central stations in formulating schedules for power consumers and other classes of customers who perhaps do not pay their full share of fixed charges, but whose acquisition in connection with the plant already operating permits a reduction in the average cost of energy supplied.

The form of rate in question has proved very popular in English communities where it has been adopted, as is evidenced by the large increase of the consumers connected to the lines. In most cases the form of charge we refer to is elective and the majority of new customers choose to be served under this form of schedule.

There are a number of companies in this country having a step system of rates which has enabled a cooking load to be supplied at the minimum rate, but in most cases this minimum is not less than three cents per kilowatt-hour for residence consumers. The experience of English companies would point out the feasibility of making this minimum rate less than is now customary. A cooking load could probably be acquired in this country at a rate somewhat higher than is necessary to secure it in England; but electric cooking will never become generally popular while the cost remains unreasonably high as compared with the direct use of fuel.

In many cases the problem is complicated by the necessity of supplying hot water from the same source of energy. According to the evidence of Mr. D. F. Henderson given at the recent convention of the American Institute of Electrical Engineers, this problem has been successfully solved in Spokane, Wash., where a water heater is operated upon a flat rate and left permanently connected to the line except when the electric range is in use. The switch is so arranged that when energy is used for cooking the water heater is disconnected.

COURTESY BY UTILITY EMPLOYEES.

It has been announced that one of the great railroad systems of the country has decided to have regular meetings of its employees, which are to be designated as "courtesy meetings." It has been felt that something of this kind is needed to cultivate the proper attitude of the employees towards the public with whom they come in contact and to eliminate the rudeness and boorishness on the part of conductors, porters, ticket sellers, and other employees of the corporation. It is felt that such conduct, as to which there are frequent complaints, can be avoided, and that neither efficiency nor speed in carrying on a man's work need to be sacrificed because he takes the trouble to exercise good manners.

The consideration of this subject is entirely in order on the part of electric utilities, where examples of discourtesy and boorishness are not entirely lacking. Such conduct is frequently due entirely to thoughtlessness, and not to any intention on the part of the employee to be deliberately ill-mannered. The cultivation of a desirable attitude towards those with whom one comes in contact should, however, be the result of a deliberate purpose, and it is only by giving thought to the subject that the purpose and its achievement can be realized upon the part of all employees. The elevation of courtesy to the position of a slogan, and regular discussion as to the details of what it covers and how it is to be achieved and practiced, serve to keep the subject in the minds of the employees and will result in more definite efforts to get results.

Telephone companies have, perhaps, placed more emphasis upon the use of the word "please" and similar evidences of courtesy than have the other utility companies. But there is no reason why the use of polite language should be limited to conversation over the telephone. Those who have given study to this subject sincerely believe not only that time and thought given to the exercise of courtesy is not only not wasted, but actually brings a financial return.

NATIONAL ELECTRICAL CONTRACTORS' ASSOCIATION.

Program of Annual Convention to be Held at San Francisco Next Week.

The fifteenth annual convention of the National Electrical Contractors' Association of the United States will be held at San Francisco, Cal., July 21 to 24. A special train to the convention left New York City over the New York Central Railroad on Saturday, July 10, at 5:30 p. m., the route being by way of Chicago, Kansas City, Los Angeles and San Diego, with a stop in Arizona at the Grand Canyon. The train will arrive at San Francisco on Sunday, July 18, at 9:55 a. m.

On Monday, July 19, there will be an executive meeting of the California Association of Electrical Contractors and Dealers at the Auditorium, at 9:00 a. m. and an open meeting at 1:00 p. m. On Tuesday there will be a meeting of the National directors and Executive Committee at the Clift Hotel at 10:00 a. m. At 6:30 p. m. there will be the regular monthly meeting and dinner of the California Association at the Clift Hotel. The principal speaker of the evening will be W. L. Goodwin, vice-president and general sales manager of the Pacific States Electric Company. His topic will be "Co-operation Between Contractors and Jobbers."

Wednesday, July 21.

The National Electrical Contractors' convention will open on Wednesday, July 21, with an open session at the Auditorium, Market, Hayes and Larkin Streets, at 10:00 a. m.

Address of Welcome, C. F. Butte, president of the San Francisco Association.

Address by John R. Galloway, president of the National Electrical Contractors' Association.

Address by C. V. Schneider, president of the California Association of Electrical Contractors and Dealers.

Address by James Rolph, Jr., mayor of San Francisco.

Illustrated address by John A. Britton, president of the Pacific Gas and Electric Company.

Address by C. C. Moore, director-general of the Panama-Pacific International Exposition.

Short talk by George B. Muldaur, of the Society for Electrical Development, Incorporated.

Address by Thomas A. Addison, Pacific Coast manager of the General Electric Company.

Business session at 2:30 p. m.

Reception and dance at Clift Hotel at 9:00 p. m.

Thursday, July 22.

Business session at Auditorium, 10:00 a. m.

Automobile ride for ladies and guests through Golden Gate Park and Presidio, 2:00 p. m.

Business session, Auditorium, 2:30 p. m.

National Electrical Contractors' Association night at the "Zone," Exposition Grounds, evening.

Friday, July 23.

Final business session at Auditorium, 10:00 a. m.

Board of Directors at Clift Hotel, 2:30 p. m.

Executive Committee at Clift Hotel, 3:30 p. m.

Dinner-dance and vaudeville at Pompeian Court, Hale Building, Fifth and Market Streets, 7:00 p. m.

Saturday, July 24.

Trip by special steamer around San Francisco Bay and through the Golden Gate, landing at Exposition Grounds early in the afternoon. Luncheon to be served on board, 9:00 a. m.

At 3:00 p. m. there will be a demonstration of transcontinental telephony at the Palace of Liberal Arts, in the auditorium of the American Telephone and Telegraph Company. Conversation will be carried on with members of the Association in New York City.

There will be several important reports read at the convention. They are:

E. McCleary, "The National Electrical Code."

G. M. Sanborn, "Universal Data and Sales Book"; also "Conduit Charts."

J. T. Marron, "Membership."

P. H. Jaehnig, "Legislation, Ordinances and Laws for Electrical Contractors."

Joseph A. Fowler, "Liability Insurance and Workmen's Compensation."

James R. Strong, "Convention Details."

A. J. Hixon, "Reducing Cost of Electrical Construction."

George E. Shepherd, "Publication."

Ernest Freeman, "Co-operative Protective Committee"; "Concentric Wiring"; and "Bookkeeping System."

Marconi International Progress.

The directors of the Marconi International Marine Communication Company show that notwithstanding disorganization and loss due to war, the business made substantial progress. Revenue from ships' telegrams, subsidies, etc., was $875,105 for 1914 as compared with $731,584 for 1913. The number of telegraph stations owned and worked by the company as public telegraph stations on the high seas increased during the year from 788 to 905, and during 1915 further progress has been made, the number now being 970. There are now over 2,000 ships, exclusive of ships of war, fitted with Marconi telegraph stations, chiefly worked under this and allied companies.

Program for New England Section N. E. L. A. Convention.

A preliminary program for the convention of the New England Section, N. E. L. A., has been formulated and includes a reception, cards and dancing on the first evening, September 14; two business sessions on September 15, devoted to "Power," with papers by managers of isolated plants and central-station representatives; a formal dinner in the evening, with National Association officers, the Governor of Maine and members of New England utility commissions as guests; a Public Service Commission session the morning of September 16, and in the afternoon a paper, with discussion, on "Present Developments of the Type C Lamp." The morning of September 17 will be given to electric vehicles, with a report by E. S. Mansfield; the afternoon will be devoted to sports. The convention will be held at the Mt. Kineo House, Kineo, Maine.

First Electric Automobile in Edinburgh.

No vehicles driven by electric power have heretofore been in use in Edinburgh, Scotland, for pleasure or business. It is noteworthy that the Edinburgh municipal corporation is the first purchaser of an electric vehicle in the district, and still more noteworthy that it is the intention of the committee in charge of the municipal electric plant to encourage the introduction of electric trucks, vans, and other cars. The committee has acquired, through a London agency, an American-built electric lorry or wagon, having a carrying capacity of one and a half tons and a guaranteed speed of 11 miles per hour on the level and 5 miles per hour on a gradient of 1 in 10 with full load. The accumulators are of the Edison type. With a full charge, the lorry is capable of traveling 40 miles with a load of one and a half tons and 50 miles with a half load. The control is effected by one handle fixed to the steering wheel, which alters the speed of the motor, so that there are only the controller and brake to operate.

The electricity required for one full charge is about 35 kilowatt-hours. With electricity at one penny (two cents) per unit, the cost per mile will be slightly less than 1.75 cents on moderately level roads with good surface.

The committee has undertaken to supply electricity for the charging of such vehicles at the rate of one penny per unit and has made arrangements not only for charging, but also for storing lorries in the municipal electric stations. It is considered not unlikely that the result will be a fair demand for commercial electric lorries and vans and also electric cars for pleasure and professional purposes.

Electricity in Implement Manufacturing.

By W. J. Kyle.

A brief summary of the advantages of electric motor drive in a farm-implement establishment are given in this article, together with a comparison of isolated-plant and central-station costs. An annual saving of 30 per cent is made by using purchased power in this case. Data are given on the motor installation.

There has been a great deal of matter written on the subject of central-station power and the application of motor drive to various industries, all of which are interesting in many features.

The plant about to be treated manufactures the cutting parts of farming implements such as the triangular sections of a reaper, sickles, guard plates, rake teeth, etc., and these parts are purchased by the farming implement manufacturers and form the most important part of such implements, great care being taken in the selection of material, grinding, fitting and tempering of the sections.

Group of Grindstones Driven by Individual Motors.

When the writer negotiated this proposition for the central station it was estimated that the average monthly consumption of energy would be 22,897 kilowatt-hours and the monthly average obtained for the first six months after electrification was complete and full operation was maintained on central-station service was 22,888 kilowatt-hours.

In the manufacture of cutting parts the bevel cutting edge is first ground on large stones while a continuous flow of water is maintained over the surface. This water in the plant under consideration is furnished by two centrifugal pumps drawing water from a number of well points, the water being close to the surface and ball check valves placed in the suction between the well point and pipe connection. This maintains the pump primed, but in case of failure of any check to properly operate the pumps can be primed from the tank located on the roof of the building, the tank acting as a static head for the water distribution. The pumps are controlled by an automatic governor from a float switch in the tank.

The water after being used on the grindstones flows by gravity to a sump in which is placed a submerged centrifugal pump driven by a vertical squirrel-cage motor operated with a float switch in the sump. The discharge from the pump is outside of the building and flows by gravity to a creek near the plant.

Fire protection is provided for by a 60,000-gallon tank on a tower and a 60,000-gallon concrete cistern located

slightly above the pump level. There is a pump of 1,000 gallons per minute capacity driven by 100-horsepower induction motor located in a brick building isolated from the main buildings. The pump takes suction from the cistern and discharges into the sprinkler system. Hose connections are also provided and a pressure of 120 pounds can be secured from the pump. This motor has a separate bank of transformers and the lines are brought in to avoid interference in case of fire.

The heating system is low pressure and vacuum is maintained with a variable-speed motor-driven vacuum pump, returning the water to the boiler.

The large grindstones shown in one of the accompanying illustrations are 13 inches face by 6 feet diameter, and weigh slightly over 5,000 pounds, each, when new. These stones are used until they are worn down to about 40 inches in diameter, when they are then replaced by stones of 6 feet diameter. Each is driven by a 15-horsepower slip-ring motor.

The problem encountered in this installation was the high starting effort required to start the stones when new, which was at their maximum weight. It can be readily seen that various starting-duty and operating conditions had to be met. When the stones are of full size the average power required for operating is slightly lower than normal, due to the fact that there is considerable stored energy in the fly-wheel effect but power required for starting is at maximum. As the stone wears down, it reduces the starting torque required, and increases the power for operating. As the stones wear down, the pulley on the shaft is changed, so that the peripheral speed is maintained at all times the same, during the life of the stone. The mechanical arrangement of mounting these motors has proved very satisfactory. The motors are mounted on four channel irons running parallel through the shop, two on each side of the motor base. These channel irons are bolted to the I-beams, supporting the roof trusses. This affords very rigid support, and easy adjustment for the motors and holds them in complete alinement with the grindstone shaft. From the illustrations, it will be noted that the circuit-breakers are mounted close to the motors, and are operated by two cords, one for throwing in the circuit-breaker, and the other for throwing it out. This is done to afford easy access for the operator in case he wishes to stop the motor quickly. The operators are not permitted to start the motors. When it is necessary to start or stop the motors the foreman operates the controllers which are located in the foreman's office, and incased in glass. This arrangement affords him a complete view of the shop, and the machinery he is starting. The reason for this arrangement is on account of the class of labor employed, the superintendent believing that by having one man responsible for the care of the apparatus, it would be kept in better condition, and experience has proved him correct.

Group of Grinders Driven by Individual Motors.

One of the stones shown in one of the illustrations is an automatic machine which grinds the triangular sections automatically. This machine is fed automatically, and discharges its product automatically in a bucket placed under the machine. It is operated by one man, and equipped with a 30-horsepower slip-ring motor. This motor is the only one that is started and stopped by the operator of the machine, who is expressly instructed

Farm-Implement Manufacturing—Data Sheet No. 1.

The term load-factor is used in these data in such a sense that a load-factor of 100 per cent represents the use for twenty-four hours every day of power corresponding to the rated capacity of the motors connected. An operating-time load-factor of 100 per cent represents the use of the rated capacity of the motors for the running hours per day specified for each installation.

Company manufacturing power knives, reaper sickles, guard plates, lawn mowers, etc. There are 150 men employed working 10 hours per day.

Total connected horsepower, 619. Total number of motors installed, 54. Average kilowatt-hours per month, 22,888.

Load-factor 6.8 per cent; operating-time load-factor 15 per cent.

The following is a list of the motors installed with their respective drives. The supply source is three-phase, 60 cycles, 440 volts. All motors, unless otherwise specified, are of the squirrel-cage induction type.

No.	Horse-power	Speed R. P. M.	Application
8	15	850	Slip-ring motors, each belted direct to a grindstone. Stones average about 36 inches diameter and 12-inch face. They are used to grind bevel on the cutting implements. Driving pulley 10 by 9. Driven pulleys 28 by 8 inches.
1	5	1,120	Vertical motor coupled to an American Well Works vertical bilge pump. No. 2½, capacity 200 gallons per minute, 3-inch suction and 2.5-inch discharge pipe vertically mounted with float chains and a Cutler-Hammer switch automatically starting and stopping motor. This pumps out the water and dirt from the well and the grindstones.
1	20	690	Slip-ring motor, belted to a large grindstone used for beveling cutters. Stone is 72 by 12 inches. Pulley 9 by 9 inches. Driven pulley 42 by 8 inches.
10	15	870	Slip-ring motors belted to 10 grindstones for beveling cutting tools. Stones vary in size between 48 by 14 and 72 by 14 inches. Pulleys 10 by 9 inches. Driven pulleys 20 by 8.
5	7.5	1,120	Belted to five surface girders. Stones have grinding face (side) average about 30 inches. Pulleys 8 by 9 inches. Driven pulleys 24 by 8 inches.
1	20	850	Belted to a surface grinder. Stone has a grinding face (side) of 36 inches. Pulley 8 by 9 inches. Driven pulley 24 by 8 inches.
1	5	850	Belted direct to Williams White & Company No. 3 hammer.
1	7.5	850	Belted to a Garden City blower No. 1. Pulley 6 by 10 inches. Driven pulley 24 by 8 inches.
1	10	1,120	Belted to a 78-foot 10-hanger shaft driving four automatic-feed 76-link hardening machines and four hand-feed 76-link hardening machines. These machines are about 10 feet long and the links each carry one piece to be hardened. It is driven by a chain and sprocket from the line shaft. Two two-foot by three-foot tumbling barrels. One 100-pound drop hammer.
1	10	1,120	Belted to a 50-foot 7-bearing shaft driving one No. 3 Parker punch press, flywheel, 48 by 5 inches; one scrap cutter; one small emery wheel; three machines for serrating sections; three guard-plate cutting machines; one A. Leggoe & Company machine for serrating special knives; one American Gas Furnace Company high-pressure blower; one Webster & Perks Tool Company section serrating machine; one section serrating machine; one emery wheel 14 by 2 inches; one Pittsburgh counter-sinker; two Parker small punches, flywheels 24 by 3 inches; one 30-foot four-hangers shaft driving one small punch for guard plates; one E. W. Bliss Company automatic punch, No. 3 flywheel 38 by 5.5 inches; one Pittsburgh Machine Works counter-sinker; one roller for straightening small bars; one Bliss punch, flywheel 36 by 5 inches, and one double emery wheel.
2	3	1,120	Backgeared and belted to two Bliss No. 4 blanking presses, flywheels 42 by 6 inches. One of these machines is located in the machine shop.
1	10	1,700	Belted to a 36-foot 5-hanger shaft driving one Bliss No. 5 punch, flywheel 46 by 6 inches; one Bliss shear for cutting sections, flywheel 42 by 6 inches; one Pratt & Whiting 12-inch drill; two Stiles & Parkin presses No. 1, flywheels 26 by 3 inches; one Pratt & Whitney 12-inch drill; one guard milling machine; one special punch, flywheel 48 by 5.5 inches.
1	3	1,700	Belted to a riveting machine that will rivet three at a time, flywheel 36 by 5.5 inches.
1	1	1,700	Belted to a small gasoline pump.
1	10	1,120	Belted to a 45-foot 7-hanger shaft driving one 16-inch Steptoe shaper; one Fox Machine Company No. 23 milling machine; one Danson & Goodwin 16-inch lathe; two E. W. Bliss No. 2 presses, flywheel 30 by 4 inches; one special press, flywheel 27 by 3 inches, and one small screw machine.

Farm-Implement Manufacturing—Data Sheet No. 2.

1	10	1,120	Belted to a 42-foot 7-hanger shaft driving a Dietz, Gang & Company 24-inch lathe; one double emery wheel 4 by 0.5 inches; one automatic tool sharpener; one Smith & Mills 16-inch shaper; one Knecht Brothers Company 12-inch drill; one Barnes 24-inch drill; two Q & C hack saws for 12-inch blades; one H. C. Pease & Company plane; one double buffing arbor, wheels 16 by 4 inches; one small surface grinder, 7-inch wheel; one two-spindle drill; one Bliss No. 2 punch, flywheel 30 by 4 inches; one two-spindle drill, 16 inches; one special drill; one special surface-grinding machine; one grindstone 18 by 3 inches, grinds surfaces of cutters; one Rudolph's Krummel No. 4 punch, flywheel 26 by 6 inches; and one machine carrying two sets of rolls for treating sections.
1	15	1,120	Belted to a 72-foot 10-hanger shaft driving one Pratt & Whitney 24-inch drill; one Barnes 18-inch drill; four Barnes 20-inch drill; one double emery wheel; one small fan about 12 inches in diameter for a forge fire. There is also another centrifugal fan for exhausting the 6 or 8 emery wheels.
1	5	1,120	Belted to a 50-foot 7-hanger shaft driving one four-spindle Barnes drill press; one Barnes 28-inch drill; one Barnes 22.5-inch drill; one Kempsmith Manufacturing Company No. 32 plain miller; one Garvin Machine Company No. 2 plain miller; one Fox Machine Company No. 3 miller; and one milling machine.
2	10	1,080	Belted to a 52-foot 8-hanger shaft driving two double emery wheels, Northampton, 9 by 2 and 10 by 2 inches; one double 16-inch buffer; one No. 1 Styles & Parker punch, flywheel 6 by 3 inches; two double Northampton surface grinding wheels, 8-inch face, and one double emery wheel.
1	7.5	1,150	Direct-coupled to shaft of drum of a 3,000-pound freight elevator at 50 feet.
2	30	1,120	Slip-ring motors belted to two automatic surface-grinding machines. Grinds the surfaces of the cutting tools. Pulleys 15.5 by 9 inches. Driven pulleys 22 by 8.5 inches.
5	7.5	1,120	Belted to five hand-feed surface grinders. Grinders average about 28 inches in diameter. Pulleys 8 by 9 inches. Driven pulleys 30 by 8 inches.
2	2	1,120	Belted to two finishing machines.
1	5	1,120	Belted to a finishing girder for heavier work. Grindstone is 14 inches by 3 inches. Driven pulley is 28 by 6 inches.
1	20	850	Belted to a sickle grinder. This consists of a stone about 42 inches face or diameter across which the whole sickle is pulled and thus sharpened. Pulley 10 by 11 inches. Driven pulley 36 by 8 inches.
2	15	690	Slip-ring motors belted to two stones used both as a grinder to bevel the cutter and also to grind surfaces. Two men on each grindstone at a time, one nearly on top and one in front. Stones are 40 by 14 inches. Pulley 9 by 9 inches. Driven pulleys 30 by 8 inches.

Company manufacturing a small line of farm and garden implements, such as hoes, rakes, garden plows, etc. There are 12 men employed, working 8 hours per day.

Total connected horsepower, 89. Total number of motors installed, 12. Average kilowatt-hours per month, 2,730.

Kilowatt-hour consumption for 9 months: July 2,270, August 3,050, September 2,060, October 2,730, November 2,240, December 4,180, January 2,560, February 2,600, March 2,750.

Load-factor, 5.6 per cent; operating-time load-factor, 14 per cent.

The following is a list of the motors installed with their respective drives. The supply source is two-phase, 60 cycles, 220 volts.

No.	Horse-power	Speed R. P. M.	Application.
1	50	690	Belted direct to air compressor.
1	7.5	1,200	Belted direct to Prentice engine lathe.
1	5	1,200	Belted direct to one S. & M. two-spindle shaper.
1	5	1,200	Belted direct to one Prentice 30-inch drill press.
1	2	1,700	Belted to a Buffalo No. 3 forge blower; and one 12-inch emery wheel.
1	25	1,200	Belted direct to a No. 3 mortising machine.
1	15	1,200	Belted direct to one cut-off saw.
1	10	900	Belted direct to one 18-inch rip saw.
1	7.5	900	Belted direct to one grindstone.
1	5	1,200	Belted direct to one grindstone.
1	2	1,200	Belted direct to one 36-inch band saw.
1	5	1,200	Geared direct to one milling machine.

as to its care and operation. The grindstone on this machine does its grinding on the side face of the stone, and there is a disk, which revolves in the opposite direction, which carries the plate, and grinds the entire surface of the triangular section, there being three sections in contact with the stone at one time. The starting torque required on this machine is extremely heavy, and the operating load is very constant. This machine is giving very good satisfaction, although when deciding on this application, it was impossible to make a satisfactory test upon it and the application was based largely on the engine test.

The other stones shown are driven by squirrel-cage motors. They are approximately 29 inches in diameter, and are called "surface grinders." These machines are started and stopped by the ordinary autostarter or compensator and the operators handle the autostarters themselves, starting and stopping same at their leisure. The machine shop is equipped with squirrel-cage motors for driving the short line-shaft groups.

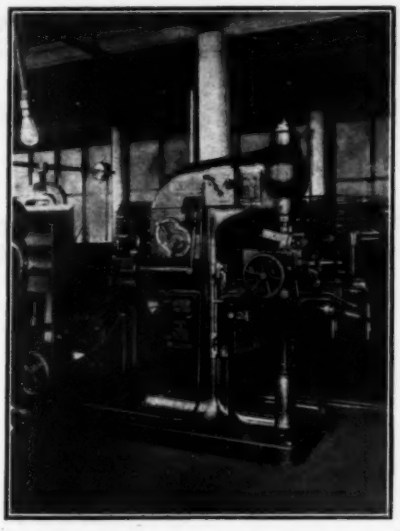
The illumination of the plant is accomplished entirely by clusters of tungsten-filament lamps in suitable ceiling fixtures. The shop is readily operated nights, as well as daytime. The energy furnished is three-phase, 60-cycle, 440 volts obtained from the local central-station company. It is brought into the building, and taken through the meters on a three-panel switchboard and from there distributed to the various parts of the shop. The entire installation is wired in iron conduit throughout.

The following is a comparison of the previous steam-plant costs with present costs of central-station service. An outline of the motor installation is given in the accompanying table.

Monthly Operating Costs Steam Plant.

(Figures from Books.)

Engineer	$ 80.00
Fireman	50.00
Coal passer	50.00
325 tons of fuel @ $1.50 per ton.	487.50
Repairs to engine, boiler, valves, piping, boiler tube cleaning, etc.	110.00
Cylinder and engine oil	5.67
Boiler compound	17.00
Waste and packing	4.20
Total	$804.37



Three-Horsepower Motor Driving Milling Machine.

Record of Electrical Operations 260 Hours Per Month.

	Kilowatts	Kilowatt-Hours
Tower shop, including all friction	12.3	3,198
Grinding room, eliminating friction	52.4	13,645
Machine shop, including friction	16.2	4,212
Ventilating fan	2.0	520
Small service pump	2.4	624
Factory lighting	20.0	700
Total		22,897

The cost of change to produce the above results was $5,895.

At the rate earned by the company the approximate saving in operating costs per month is 30 per cent.

Electric Shovel To Be Used In Coal Mining.

The Piney Fork Coal Company, with headquarters at Columbus, O., is starting a coal stripping operation in Jefferson county, of that state, which will employ what is said to be the first electric power shovel ever used in connection with coal mining. The shovel itself, the manufacturers state, will have the largest boom of any machine ever built for excavating. The boom will be 90 feet long. That of the shovels used in the Panama Canal work was 70 feet.

A five-yard dipper will rip up a strip of earth 135 feet wide with one placement of the shovel, owing to the great sweep of the boom. The lowest point necessary to go in order to reach the top of the coal is 50 feet, and in many portions of the tract the seam lies much nearer to the surface. The shovel is being built according to specifications that will give it this maximum depth in digging from an original level. Electricity is to be used because it will permit of more steady operation than steam power. In the latter water for boilers would have to be conveyed by exposed pipes, which would be subject to freezing in the winter time. Power for the operation of the shovel will be purchased from Wheeling, W. Va.

The Louisville Gas & Electric Company for the week ended June 25 secured contracts from 125 electric customers with 81 kilowatts of lighting and 130 horsepower in motors. For the first six months of 1915 the company increased its number of electric customers by 1,700 or 7.4 per cent and its gas customers by 1,200 or 2.3 per cent.

Individual Motor Drive of Machine Tools.

Two-Horsepower Motor Geared to Shaper.

Commercial Practice
Management, Rates, New Business

A House Electric at No Cost.

The New Orleans Railway & Light Company has been fortunate in a recent opportunity which practically amounted to a "House Electric" at no cost. The company learned that the Maison Blanche, one of the largest New Orleans department stores, was about to feature as an educational advertising influence, a complete modern bungalow constructed and equipped on one of the floors of the store. This bungalow was furnished and decorated from the store's own stock on a very elaborate and interesting scale. The company immediately offered to co-operate by installing lamps and a complete assortment of electric household appliances of the latest type and the Maison Blanche Company responded with enthusiasm, realizing that the additional display would add greatly to the attractiveness of the bungalow.

It is estimated that the exhibit is being visited by not less than 3,000 people each week and it will undoubtedly stimulate the public interest in the household applications of electricity as nothing else would.

Cool Weather Affects Consumption.

Abnormally cool weather, coolest in 42 years—according to the records of the Weather Bureau, has been experienced in Louisville this summer, with an effect on the sales of electric fans and consumption of current such as might be expected. Although the middle of July has arrived, a time usually marked by torrid weather, the highest the thermometer has reached is 89 degrees, and that was on an April day. In spite of this condition, sales of the new $2.99 panel board of the Louisville Gas & Electric Company have been going on at the rate of 25 or 30 a day, the boards being placed as fast as they are made and delivered to the company.

The Louisville company has not been making a detailed comparison of this year with other years, but it is apparent that the consumption for this summer is below normal. Especially is this true in the business district where a large portion of the electric fans are ordinarily in use.

"Motors on hire" are advertised by the Municipal Electricity Department of Shanghai, China.

Fan Keeps Flies Out of Restaurant.

The use of ceiling fans for restaurants and other business places has increased in favor in the cities around Boston. In one suburban community a coffee-house proprietor has installed an ordinary ceiling-type fan 3.5 feet in diameter over the entrance to his restaurant, with a four-foot metal hood over the fan and motor for protection to the apparatus and also to "create a breeze."

The fan overhangs the sidewalk and

Ceiling Fan Over Entrance to Restaurant.

its movement is an allurement for passersby to enter the attractive place of refection, being assured that there will be no annoyance from flies.

Big Hotel Installation in London.

The electrical installation at the new Regent Palace Hotel, Piccadilly Circus, London, is considered to be the most extensive of its kind in Europe. The hotel has considerably more than a thousand bedrooms each having its electric radiator of 1.5 kilowatts capacity, and altogether 6,000 electric lamps are installed. The hotel complete is said to have cost $3,000,000. More than 300,000 feet of screwed conduit and 180 miles of electric cable are installed. Energy is obtained from a public supply company's mains at 220 volts. Steel conduit is used throughout with brass unions, and a special watertight junction-box placed at frequent intervals enables any length of wire or cable to be drawn out without causing interference with the structure, decorations, etc. Each of the bedrooms has two lights with a three-point switch at the bedside, and corridor lights, which are centrally controlled from master switches, are on a circuit independent of the bedroom lighting. Semi-direct illumination is the system generally in vogue. Of the 32 electric elevators five are passenger, one a luggage lift and two goods lifts serving nine floors, also a number for service and restaurant purposes. Electric motors ranging from 2 to 8 horsepower drive the vacuum-cleaning equipment, a refrigerator, ice-making machine, almond crusher, a whisk, a bacon-cutter, a mincing machine and boot-cleaning machines. For the cold-storage rooms a special refrigerating plant is provided; an 18-horsepower motor drives it, and a motor of 2.75-horsepower drives its brine-circulating pump. Motor-driven ventilating fans are used, two large centrifugal fans serving the chief reception rooms, and all the other principal rooms have their independent air-extracting fans; a five-horsepower motor drives a Sirocco fan for the large linen room, and a duct running to the top of the building ventilates each bedroom, etc. The temperature of hot water, which is supplied to every bedroom, and to the general hotel compartments, is controlled by means of special electric valves, and electrically driven pumps assist the circulation. The entire installation is controlled by one man and a number of contrivances, chiefly electrical, expressly designed by the designer of the whole installation, A. H. Barker, which have not yet been completed, owing to the general state of affairs, will enable the temperature to be ascertained here of practically any part of the hotel. Telephones, electric bells, and a motor-driven pneumatic-tube service, are included in the installation. The heating circuits are controlled from a special 30-foot distributing board in a chamber situated in the basement part of the building, the board having 60 double-pole fuses and switches. The whole of the heaters can be turned on at once without harm. Alternative sources of supply are of course provided.

Successful Electric Show Held in Cincinnati.

The Electric Shop, conducted for the past year by the Union Gas & Electric Company, Cincinnati, O., as a retail selling and demonstrating agency for various electrical appliances, was the scene recently of what was termed the first annual electrical show, participated in by a number of manufacturers of electrical goods, and open free of charge to the public. The extent to which public interest was aroused may be gathered from the attendance figures, which, with an estimate of only 1,000 for Saturday, the last day of the show, runs to 14,100, despite inclement weather on several days during the week.

The idea of holding a show, at which a wide variety of electrical appliances for various domestic purposes could be shown and demonstrated in addition to the goods always on display by the company, is credited to R. E. Flower, manager of the store.

Among the manufacturers who displayed goods in space allotted to them in the store for that purpose were the following: Westinghouse Electric & Manufacturing Company, General Electric Company, H. W. Johns-Manville Company, showing its electrically operated ice and refrigerating machinery; the Bissell Motor Company, the Clements Manufacturing Company, the Eureka Vacuum Cleaner Company, Standard Electric Stove Company, with electric ranges and fireless cookers; the Hamilton Beach Company, with its line of electric toilet appliances; the Landers-Frary-Clark Company, showing its "Universal" appliances; the Brokaw-Eden Manufacturing Company, with the Eden washing-machine; while an electrically operated Columbia phonograph furnished music, the noon concerts held during the week proving especially popular.

Liberal newspaper space was used to keep the public apprised of the show, in advance as well as during the week; and besides this, other methods were used for the same purpose. All of the Union Gas & Electric Company's electric consumers were notified at their last billing that the show would be held, and their attendance, as being among those who would naturally be interested in so extensive a display of electric domestic goods, was invited. Souvenirs were given to visitors during the entire week; and crowds were attracted to the building, which is favorably located at Fourth and Race Streets, by elaborate decorations and the clever displays in the two windows.

One of the windows was devoted to electric fans, the other being given over to lamps. A unique feature of the latter was the fact that a tiny marmoset and a rabbit were kept in the window, it being asserted that the pair were very fond of each other, and this was apparently the case. The presence of the monkey naturally excited curiosity, and it was connected up with the electric bulbs shown by a card declaring that the lamps could be "monkeyed" with without hurting them. The attendance during the week indicates pretty conclusively that the publicity end of the show was well attended to.

Sales during the week also showed a heavy increase over an ordinary week, as might be expected, although much of the efforts of the various salesmen on hand, connected with the Union Gas & Electric Company and the exhibiting manufacturers, were of course devoted to demonstration work and to securing the names of prospects. They were especially successful in the latter connection, as all visitors were requested to register and many indicated special interest in some specific device.

A pleasant event of the week, held in the dining room, was the dinner given by Mr. Flower and his assistants, to the eight manufacturers' representatives who attended the show. All of the items on the menu were prepared by means of electricity, and electricity was much in evidence in other respects.

The unqualified success of the display, and the extent of the interest shown by the public, makes it certain that the show will be repeated annually.

Tea Room of Cincinnati Electric Shop.

Portion of Appliance Display Cases.

Springfield Company Inaugurates Rural Service.

A big civic celebration marked the switching on of electric lights in the streets and a score of homes of Rochester, a little town of 600 inhabitants near Springfield, Ill., on July 9. Energy is supplied by the Springfield Gas & Electric Company.

The city is one of the most modernly lighted in the middle west. It has installed the new nitrogen-filled tungsten lamps with Holophane refractors for street service and the results are so pleasing that many of the prominent residents are placing standard lamps with the same equipment in their lawns and on their porches.

There are more than 150 homes in the little village and 20 per cent of them are already wired. Many farmers along the route of the seven-mile transmission line are using service.

New Power Business at Minneapolis.

The sales department of the Minneapolis General Electric Company during the week ending June 25 secured contracts for 231 electric customers with 227 kilowatts lighting load and 1,104 horsepower in motors. The power business secured includes 800 horsepower for the Atkinson Milling Company, a new flour mill.

SUCCESSFUL COMMERCIAL MANAGERS.

Frank D. Beardslee.

"There are many difficulties encountered by central stations in securing business but there is rarely any difficulty which cannot be overcome by the use of a broad mind and good judgment." F. D. Beardslee, sales manager of the Union Electric Light & Power Company, St. Louis, Mo., who is the author of this creed for commercial managers, has convincingly demonstrated its truth, as the new-business records of the Union company testify. And the actual statistics on increased connected load, overwhelming as they are, is not the only manifestation of the unusually broad mind and rare judgment of Mr. Beardslee. Perhaps no company enjoys more harmonious relations with its customers and the public in general than the Union Electric Light & Power Company of St. Louis but this situation is not the result of a natural evolution of public opinion. Instead, almost heroic effort has had to be extended, first, to remove the natural antagonism against public utilities and then by the adoption of the "public-be-pleased" policy to mold public sentiment in favor of the company.

Mr. Beardslee was one of the first to realize that the public forms its opinions of the company by the treatment received from employees and has organized his department with the theory in mind that every salesman must be in reality, as well as in name, a representative of the company. With this same thought in view he has established a school for employees where the company's policies in regard to the public are drilled into the men and when it is found necessary to fill a position in the sales department, records of the educational classes are examined and men are promoted according to their class rating.

Periodic departmental meetings of division heads and of all employees is another policy of Mr. Beardslee which has had its effect in improving the service of the company and gaining the good will of the public. At these meetings matters for the good of the service are brought up by employees and provisions are made to immediately rectify any trouble or adopt beneficial suggestions.

Other innovations established by Mr. Beardslee at St. Louis, all of which have contributed to the success of the company commercially, have been a clearing house for sales-department data, supervised by an efficient clerk, where salesmen can obtain data on any completed or pending transaction, or information relative to any phase of commercial-department work; and a clipping bureau which obtains information respecting prospective business from newspapers, building reports, etc.

Mr. Beardslee, although a young man, is one of the veteran employees of the company and has seen service in most of the departments. The Missouri Electric Light & Power Company was incorporated December 29, 1888, and started in business February, 1889, succeeding the Metropolitan Electric Company, and two months later F. D. Beardslee was employed as office boy. Shortly after, he became meter reader, bill clerk and collector, reading meters for several days each month, then making out and collecting bills, and at odd times doing wiring, meter and test work.

Frank D. Beardslee,
Sales Manager, Union Electric Light & Power Company, St. Louis.

At this time the only incandescent lighting circuit in St. Louis ran from Channing and Franklin Avenues along the narrow-gauge railway to Cabanne, and for some time the principal lighting business was that for residences, which paid for the service 25 cents per kilowatt-hour, as against an average of 8 cents today.

He had charge of lamp renewals and sales when a 16-candlepower lamp sold for $1.25, as against 15 cents today. For a short time he was switchboard tender at the plant then located in basement of the old St. Louis Cable & Western Railway power house at Channing and Franklin Avenues. He was contract clerk for some time, then solicitor, and when the Edison Illuminating Company of St. Louis (successor to Municipal Light & Power Company) and the Missouri Electric Light & Power Company were consolidated into the Missouri-Edison Electric Company, he became contract agent and retained this position until shortly after the consolidation of the Missouri-Edison Company and the Imperial Light, Heat & Power Company into the Union Electric Light & Power Company, when, on account of ill health, he left the city for a year and a half, returning as manager of the county properties (Suburban Electric Light & Power Company and the King Electric Company) under A. C. Einstein, president, until October, 1908, when he returned to the Union Electric Light & Power Company as commercial engineer. When the sales and commercial-engineering departments were combined, March, 1912, he became sales manager, which position he now holds.

Mr. Beardslee has seen the electric business in St. Louis grow from the old high-tension direct-current series incandescent lamps and Thomson-Houston belt-driven series arcs and 100-kilowatt belt-driven generators to the present 20,000-kilowatt turbines.

Mr. Beardslee has been active in national and local electrical societies, having served on important committees of the National Electric Light Association and others. Since April, 1913, he has held the office of secretary-treasurer of the Missouri Association of Public Utilities and has served as vice-president and now president of the St. Louis League of Electrical Interests, Jovian Chapter.

Electric Drive Effects Economy in Large Tire Factory.

By the use of specially constructed drives and control, the application of electric power to the intricate process of manufacturing automobile tires from crude rubber has resulted in remarkable success in the plant of the Wilson Tire & Rubber Company at Springfield, Ill.

The plant, recently completed, has a capacity of 500 tires per day. The building, costing in excess of $175,000, represents the latest practice in steel and concrete construction and because of the fact that electric drive was to be used throughout, the machinery was arranged entirely with a view to eliminating excess handling of material and to permit of adequate natural illumination and ventilation.

Electric drive is used throughout, energy being purchased at three-phase 60-cycles, 6,600 volts and converted to direct current by means of a 100-kilowatt rotary converter. Alternating current at 110 and 220 volts for lighting and the operation of a number of small motors is obtained by the employment of a bank of 75-kilovolt-ampere transformers. The motors used vary in size from 1 to 150 horsepower.

The largest motor in the plant drives four mixing mills where the rubber is washed and cleansed of all foreign

matter. It is geared to a line shaft with spur gears to each of the mills. The motor is a three-phase, 60-cycle machine rated at 580 revolutions per minute.

Featuring this particular installation is a unique safety device which has a double value in this particular installation. By electrical connection to a swinging arm over each of the machines within easy reach of the operator, instant control of the entire line shaft is made possible, each machine being equipped with one of the latest types of electrical clutches and brakes.

Aside from the protection which it affords the operators of all four machines it leaves the line shaft entirely free from the excessive vibration of the motor.

The calenders are of a special type and are equipped to roll the mixed rubber into sheets of any thickness. They are gear-driven by 75-horsepower motors, running at a speed of 950 revolutions per minute.

The auxiliary machines and pumps and elevators are all driven by individual motors. While the installation has not been in operation a sufficient length of time to determine fully the operating costs, the manufacturers are enthusiastic over the results and confidently expect manufacturing costs to be even less than originally estimated.

Battery-Exchange Service in Boston.

The Edison Electric Illuminating Company of Boston has completed arrangements whereby battery service will be furnished to such users of electric vehicles as purchase a General Vehicle chassis and use service at such points as may be designated by the central station. Batteries, which will be of Electric Storage Battery Company manufacture, will be charged and maintained by the Edison company and furnished to the user at a cost based on mileage with the addition of a nominal fixed charge. The complete schedule of charges is shown herewith.

That such a battery-exchange system will give decided impetus to electric-vehicle development in Boston is indicated by the contracts received considerably in advance of the actual completion of the plan.

Under the plan the chassis owner is not at the expense of purchasing any batteries, these being the property of the central-station company. The first cost of vehicles of this type is thus considerably less than with battery included, and the owner has the advantage of knowing in advance exactly what his operating costs will be. The plan follows in some respects one which has been in operation in Hartford, Conn.

SCHEDULE OF SERVICE SYSTEM CHARGES

1000-LB. WAGON	
FIXED COST	Per month $17.00
RUNNING COSTS	A price of 3c per mile will be charged for the first 500 miles the wagon is operated each month.
FIRST DEDUCTION	A price of 2½c per mile will be charged for all miles in excess of 500 and up to and including 750 each month.
SECOND DEDUCTION	A price of 2¼c per mile will be charged for all miles in excess of 750 and up to and including 1000 each month.
THIRD DEDUCTION	A price of 2c per mile will be charged for all miles in excess of 1000 each month.
2000-LB. WAGON	
FIXED COST	Per month $21.00
RUNNING COSTS	A price of 3½c per mile will be charged for the first 500 miles the wagon is operated each month.
FIRST DEDUCTION	A price of 3c per mile will be charged for all miles in excess of 500 and up to and including 750 each month
SECOND DEDUCTION	A price of 2½c per mile will be charged for all miles in excess of 750 and up to and including 1000 each month
THIRD DEDUCTION	A price of 2¼c per mile will be charged for all miles in excess of 1000 each month.
4000-LB. WAGON	
FIXED COST	Per month $28.00
RUNNING COSTS	A price of 5c per mile will be charged for the first 500 miles the wagon is operated each month.
FIRST DEDUCTION	A price of 4½c per mile will be charged for all miles in excess of 500 and up to and including 750 each month.
SECOND DEDUCTION	A price of 4c per mile will be charged for all miles in excess of 750 and up to and including 1000 each month.
THIRD DEDUCTION	A price of 3½c per mile will be charged for all miles in excess of 1000 each month.
3½-TON TRUCK	
FIXED COST	Per month $33.00
RUNNING COSTS	A price of 6c per mile will be charged for the first 500 miles the wagon is operated each month.
FIRST DEDUCTION	A price of 5½c per mile will be charged for all miles in excess of 500 and up to and including 750 each month.
SECOND DEDUCTION	A price of 5c per mile will be charged for all miles in excess of 750 and up to and including 1000 each month.
THIRD DEDUCTION	A price of 4½c per mile will be charged for all miles in excess of 1000 each month
5-TON TRUCK	
FIXED COST	Per month $36.00
RUNNING COSTS	A price of 7c per mile will be charged for the first 500 miles the wagon is operated each month.
FIRST DEDUCTION	A price of 6½c per mile will be charged for all miles in excess of 500 and up to and including 750 each month
SECOND DEDUCTION	A price of 6c per mile will be charged for all miles in excess of 750 and up to and including 1000 each month.
THIRD DEDUCTION	A price of 5½c per mile will be charged for all miles in excess of 1000 each month.

Schedule of Rates for Battery-Exchange Service.

A Letter That Eliminated Much Misunderstanding.

There are perhaps more complaints regarding supposedly high bills in November than during any other month on the central-station calendar. Much educational work has been undertaken to show the justification for the apparent jump in amount of energy used and in some of the smaller cities personal visits have been made to customers. Last November A. L. Scott, sales manager of the Edison Electric Illuminating Company, of Lebanon, Pa., conceived the idea of having representatives of the company call on all customers, informing them that the company's representatives were at their service at all times if their lighting equipment or bills were not satisfactory.

Supplementing this, the following letter was written and sent out to all consumers, inclosing a little booklet, entitled, "How to Read the Meter":

"Dear Consumer—You check your storekeepers' bills—of course you do, and we would greatly appreciate it if you would also check your electric light bills. It is just as easy, and, if you would do it, you would realize how reasonable the cost of electricity is.

"We are inclosing you herewith a booklet on 'How to Read Your Meter.' You will find on the front and back pages space for each month's reading of your meter which you can set down on the day the same is read by our employee. Doing this, when your bill arrives, which is always two or three weeks after a reading, will enable you to check your bill, and, if any error should appear, you will have the evidence and we would be only too glad to correct any errors that we make, as the policy of this company is service and courtesy at all times.

"We have at your service an expert meter reader, who will gladly call on you at any time you specify and give you full instructions as to how to read your meter. We are going to a great deal of expense in endeavoring to get all of our consumers to check their bills as closely as any other bills that they may receive.

"To make this a success we need your co-operation, as we want our service to be absolutely without a flaw.

"Always at your service, I beg to remain, yours very truly, etc.

"P. S.—A word from you will be most gratefully appreciated."

Mr. Scott reports that as a result of this letter the usual number of complaints of high bills was noticeably reduced. Reading meters was started by a few, the number gradually increasing until today practically all of the company's customers read their own meters, resulting in few kicks.

Electrical Construction

CREDITS, COLLECTIONS AND CASH DISCOUNTS.[1]

By W. H. Vilett.

The subject is so broad and comprehensive that to do it full justice would require more time and thought than we can bring to its consideration today. Consequently I shall be brief and touch upon such points as I feel will best apply to the subject.

You are all familiar with the old adage: "It takes money to make the mare go." Therefore, no difference how much business you get or how much profit you make (presuming, of course, that you are getting at least a fair margin of profit) if you do not make prompt collections your business is going to suffer for the want of money. In other words, the money that you should have in the bank is there to the credit of your customers. You all know that it is harder to collect over 50 per cent of your accounts than it is to get the orders. If some method of overcoming this could be worked out it would make the work more pleasant and profitable.

The first subject to be dealt with is Credits, the vital force in our business transactions. Every contractor is hungry for business and there is a lot of it taken of a kind such that if customer's credit standing would be carefully looked up, it would be good business policy to absolutely refuse the order, unless a cash payment was made in advance.

The man who is frank and fair should always be given the most liberal treatment even though he be deeply in debt or has not much capital to start with. By cutting off the unworthy from credit we are in position to extend it to the worthy more than we ever could before. No man should be given credit beyond his means. Don't act hastily on requests for extensions. Apply to each case a thorough investigation, make your conclusion deliberately and with material on hand which insures a sound decision.

Credit information can generally be secured through local credit-rating associations or mercantile agencies. We should be more than willing to impart credit information to competitive members of the Association for their guidance and the extension of credit favors, if this confidence would not be abused by its being used for any other than credit purposes. We should try to interest every eligible prospect in becoming a member of our organization in order that its efficiency may be increased. We should back up our faith in the organization by taking a greater personal interest in its welfare. The more efficient we make it the smaller our credit losses.

It frequently happens that credit is asked by some local invidual or combination of two or more men, whose financial responsibility is of a negligible quantity with small commercial rating or none at all. Naturally such cases require close scrutiny, and the granting of credit must be based largely on past and present business reputation, personal habits, location, probable earning power and the ability and desire to fulfill a reasonable credit contract. When such applicant is first embarking in business and seeking credit accommodation it is dangerous to place exclusive reliance in one's own investigation, as the one or more pertinent facts necessary to reach an intelligent decision may be overlooked, or the personality of the applicant may be such that his powers of persuasion would overcome any misgivings you may have. It is, therefore, advisable that the consensus of several opinions be secured, and through the banding together of local electrical interests in what is termed a "Moral Risk Club," dealing primarily with risks of this character, with their exchange of intimate ledger data, possible prior knowledge of the applicant's past performances and the desire of the membership to co-operate in such matters for the benefit of the craft as a whole, you are frequently put in possession of reliable information that will either confirm or disprove any favorable or unfavorable action you may have contemplated.

In times past such brotherly feeling among competitors would have been looked upon as the approach of the millennium, and the slightest inkling of your inner affairs coming to the knowledge of your neighbor was not to be thought of. But here we have men, in the same line of endeavor, freely discussing the value of an account, possibly of long standing with one or more of them, and frankly giving an honest estimate of the worth of the account under discussion with no fear that the information given will be used to his detriment. It is merely an exchange of business confidences among gentlemen, and the instances wherein this confidence has been violated are few indeed.

Credit risks are divided into two classes—moral and financial. Through the agency of credit-rating associations and mercantile agencies we can secure unexcelled first-hand knowledge of the financial status and personal responsibility of a concern which has been in business for a reasonable length of time, but with moral risks it is different. Here the personal equation enters, and it is only by the interchange of experience, ideas and advice through a moral risk club that the information sought can be secured and relied upon. Therefore, if credits were properly looked up collections would be simplified.

An obvious seeming reply to the query as to whom a delinquent account is paid is illustrated by the anecdote concerning a certain very "close" farmer, whom the village storekeeper urged into a liberal purchase by agreeing to wait payment until the farmer was "able and willing" to pay. The story goes that promptly after the customary maturity date the storekeeper appeared at the farmer's door, bill in hand and accompanied by the town constable with summons in a suit for debt. To the farmer's protests the storekeeper answered, acknowledging the agreement, but explaining that he "knew as how he was able" and so just brought the constable along to insure willingness.

The point is that the time of settlement of an account due from a debtor who is delinquent and yet has the ability to raise the money for payment, is reached when the conviction takes hold upon the mind of the debtor that drastic action will immediately follow a failure to make payment forthwith.

Upon the effective development of this psychological state depends the degree of success of the collection department in handling this class of accounts. Methods such as illustrated in the foregoing anecdote, though perhaps productive, leave something to be de-

1 A paper read at the Minnesota Electrical Contractors' Association meeting.

sired in the subsequent unamiable frame of mind of the debtor. It is even possible to collect with a length of gas-pipe as an argument, in some cases, but scarcely expedient as an established practice. In fact, it may be admitted that the collection method which develops a state of mind that results in payment with promptitude and in a manner calculated to keep the good will of the debtor is the one nearest perfection. Even though the subsequent trade of the delinquent is not desired, it can scarcely be denied that his passive good will is preferable to his active and certainly to some degree damaging enmity.

Such a method may be worked out, and the desired psychological stage established in the debtor's mind, if only an understanding of what leads to that mental impression is had. A conviction that the limit of leniency has been reached is the crucial and underlying factor in establishing such an impression. Proof of this is afforded in the often observed fact that a creditor may exhaust himself in personal appeals, letters, duns and threats, the repetition of which defeats their own intent, and yet the first notification from a collection agency that the account has been placed in their hands, or from an attorney, brings the delinquent to payment with surprising suddenness. Here the passing of the account from the hands of the party with whom it was contracted into the hands of a second party for the express purpose of collection effects the purpose of convincing that the period of leniency is past, with the result that payment is made to avoid the consequence of suit.

The efficacy of this as a means of establishing the desired state of mind on the part of the delinquent renders it the usual procedure, yet a failure to appreciate the underlying reason for its efficacy is what causes merchants to pay commissions to collection agencies for the use of a weapon which can equally as well be used by the creditor's own collection department through the use of a logically devised series of steps leading up to and establishing a conviction that the account has been placed in other hands for the purpose of collection.

A vital requirement of such a plan on the part of the delinquent renders it cion as to genuineness and it should also be logically consecutive in its steps, to the effect that the debtor realizes that a failure to pay at an earlier stage has resulted in the ensuing more urgent step and that the way points clearly from the first step to that eventual drastic step of turning it over for suit as an inevitable outcome of continued failure to pay.

Such a plan, with intelligently chosen steps, progressive and convincing, accomplishes all that can effectively be done in the way of pushing the class of accounts under discussion to collection and when the requirement of bringing into play the effect of turning it over to a collection agent is indicated, can operate with all the force that actually giving it into the hands of a collection agency would bring to bear.

How many concerns are there that actually know what it costs them to collect their accounts? By taking into consideration collectors' salary, attorneys' fees, stationery, postage, lost accounts, additional bookkeeping expense and interest on borrowed money (because your customer has your money in his bank) you will find that it is at least two per cent of your gross business. The problem before us, therefore, is how best can the contractor eliminate this loss. First, by scrutinizing credits more closely. Second, by charging enough for work to allow a liberal discount for prompt payment. If work is priced out as suggested by the National Electrical Contractors' price book you can afford to allow a cash discount of five per cent, if the account is paid within ten days from date of billing. Most of us allow customers to take two per cent, 30 days, as we do not wish to offend them by returning their checks. However, we are not charging enough for our labor to allow as liberal a discount as this. Therefore, I would suggest that we charge more for our labor and that no charge of less than $1.00 for time be made on any job, for unless you get at least this amount you are presenting your customers with part of your profits. Now let us take an example. Twenty hours at 75 cents equals $15.00; less 2 per cent discount would $14.70. Twenty hours at 80 cents equals $16.00; less 5 per cent would be $15.20. You would, therefore, receive 50 cents more for this same work, get your money promptly and very materially cut your cost of collections and lost accounts. You also make the customer who fails to take advantage of the liberal discount pay for collecting his account.

The above proposition would have to be worked out in each individual locality according to conditions. It is all a matter of education. Like charity, this education must begin at home. Educate the trade to understand that cash discount is a premium for the payment of an invoice within ten days, or whatever the period, before it becomes due, and that cash in 10 days does not mean cash in 15, 20 or 30 days, for at that time it is no longer a cash discount. Therefore, it would be necessary to have all invoices plainly showing the terms of settlement. This proposition should apply to time-and-material work only.

It would be well if the association would get up a regular printed form, and when improper deductions are made, because the cash-discount period is past, to simply pin this form to the check and mail it back to the offending debtor. Punctilious observance of sales terms is one of the best evidences of business integrity and good faith. You would object if a man put his hand in your pocket and took something that did not belong to him, and taking cash discount after the discount period is past is taking something that does not belong to him.

Successful business demands prompt collections and payments, and a closer observance of credits, a proper system of collections and a more strict adherence to discounts will make your business more profitable.

Massachusetts Board of Examiners.

The Board of Electrical Examiners in Massachusetts, provided for under the law which requires the employing electricians and journeymen in the state to obtain licenses after examination, has been organized with Civil Service Commissioner Hogan, of Lowell, as chairman, and David Snedden, commissioner of education, as secretary pro tem. A clerk, who must be an electrical worker with 10 years of experience, is yet to be selected. From a careful reading of the bill, it has been discovered that the Gas and Electric Light Commission is required to formulate a code under which wiring shall be done. This is said to be an unwelcome task. The office of clerk to the Examining Board is a very important one, as the task of marking the examination papers devolves solely upon him as the only technical man connected with the Board. In addition to the two members named, the Fire Prevention Commissioner completes the personnel of the Examining Board. None of them are experienced men in electrical matters, and some curiosity is expressed as to how they will proceed with their duties as outlined in the recent enactment.

The board as originally proposed in a bill which had the support of the Contractors' Association was subordinate to the Electric Light Commissioners, but the latter are now only a board of appeal, besides having the task laid upon them of formulating the code referred to.

New Michigan Officers.

The Michigan Electrical Contractors' Association has elected the following:

President, W. F. Barker; vice-president, H. C. Pappert; secretary, F. W. Woolrich; treasurer, W. D. Gale; sergeant-at-arms, F. C. Hilton; national director, John H. Busby.

Hearing on Renewable Fuses.

For some time the Economy Fuse & Manufacturing Company, of Chicago, Ill., has sought to have the renewable inclosed cartridge fuses manufactured by it favorably reported on by Underwriters' Laboratories, Incorporated, and included in the List of Electrical Fittings issued by that organization as complying with the National Electrical Code.

While the examinations and tests of Underwriters' Laboratories were favorable to the Economy fuses, the present requirements of the National Electrical Code were held to prevent the listing, as standard, of a fuse with an element readily renewable by the user.

The Electrical Committee of the National Fire Protection Association at its meeting last March recommended that no change be made in the present Code rule.

On the contrary, it was felt by the Economy Fuse & Manufacturing Company that both laboratory tests and field experience had shown its fuses to be at least as reliable and safe as fuses which had been approved.

In order that the question, as to whether the laboratory tests and field experience had or had not proven the Economy fuses to be as safe or to offer as small a life and fire hazard as approved fuses, could be passed upon by an unbiased referee, Underwriters' Laboratories, Incorporated, and the Economy Fuse & Manufacturing Company jointly appealed to the National Bureau of Standards, Washington, D. C., to act as arbitrator.

As noted in the issue of the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN for June 26, the Bureau of Standards had announced that a public hearing on this appeal would be held in Washington on July 8, in order that evidence might be submitted on the following question:

"Has it been shown that the use of fuses manufactured by the Economy Fuse & Manufacturing Company results in no greater fire or accident hazard than the use of other cartridge inclosed fuses at present listed as standard by the Underwriters' Labratories?"

In opening the hearing on the date set, Director S. W. Stratton, of the Bureau of Standards, mentioned that this case marked a new feature in the history of the Bureau. That although originally the Bureau had dealt primarily with scientific investigations and the development of standards of measurement, together with checking materials purchased on government contracts, it was now equally able to serve the public by checking standards of performance. Therefore, it was fortunate that parties in disputes, such as the one under consideration, had an impartial and scientific staff to which their questions might be referred for arbitration. He also remarked that for some two years the Bureau had been co-operating with Underwriters' Laboratories in standardizing apparatus and passing upon types of equipment.

Dr. E. B. Rosa, physicist of the Bureau, outlined the history of this appeal in so far as the Bureau was concerned, together with the method in which the problem had been approached in an impartial manner. To gather independent data, it was stated, the Bureau had sent representatives on inspection trips to learn the uses and abuses of all types of inclosed cartridge fuses; the Bureau had also conducted investigations to learn the operating characteristics of various makes of fuses, and had invited all interested in the matter to place their experience at the disposal of the Bureau for consideration.

It was asked that such material as was submitted should be put in such form that it might become a part of the permanent record on the appeal. Dr. Rosa announced that the Bureau of Standards had reserved a period of 15 days within which time evidence in rebuttal of that presented at the hearing would be received.

In opening the discussion W. H. Merrill, manager of Underwriters' Laboratories, remarked that it was fortunate that technical and scientific matters could be referred to such an organization as the Bureau of Standards for arbitration and requested that representatives of the Economy Fuse & Manufacturing Company present their arguments first.

Mr. Foote, counsel for the Economy Fuse & Manufacturing Company, presented the arguments. In part he said that many of the fuses at present listed as standard were in reality so designed and constructed as to permit of ready refilling by the user and that the printed labels calling attention to the fact that they were refillable by the maker induced the inexperienced public to attempt doing the same.

Reports were submitted to show that Economy fuses had been purchased and used in every state of the Union, in Canada, many of the European countries, in South America, and Australia. It was submitted that in the three years the appliance had been on the market their sales had been 1,089,000 complete fuses and 3,613,000 refilling elements.

A group of affidavits from municipal and insurance inspection departments and bureaus covering a rather large area was presented to indicate the present usages and abuse of standard inclosed cartridge fuses. In addition to this the field experiences and opinions of a large number of Economy fuse users were introduced.

Speaking for Underwriters' Laboratories, Mr. Merrill called attention to the fact that the appliance under consideration had been on the market but three years. Further, it was stated that within that period there had been three distinct types, or designs, of the Economy fuse and this tended to show instability.

It was submitted that the Electrical Committee of the National Fire Protection Association had unanimously recommended that at present it appeared inadvisable to recognize any fuse which was essentially refillable by the user and that the Executive Committee of the Association had indorsed their action. It was also pointed out that the opinions and field experiences from users of an appliance were probably biased in its favor, through the very fact that it was being used, and, therefore, the indorsements of users should not be given too great weight.

For the Chase & Shawmut Company and the D. & W. Fuse Company, Guy Cunningham presented the statement that each of his clients was prepared to place on the market an inclosed cartridge fuse, which was refillable by the user, should circumstances demand it. However, they both felt that such a situation was highly inadvisable. It was also stated that the investigations and experience of the two companies he represented indicated that a filling material was essential to the satisfactory operation of an inclosed cartridge fuse.

H. R. Sargent, speaking for the General Electric Company, said that the action of Underwriters' Laboratories in not recognizing a type of cartridge inclosed fuse renewable by the user had carried a very strong educational effect with it. By such action the general public had been warned that the renewal of the fuse element by the user was inadvisable and unsafe and this had assisted in checking abuses. However, it was stated that his company was prepared to place a fuse on the market which was readily renewable by the user should that become desirable, but in permitting such an appliance it was believed that the day of the fuse as a safety device had passed.

The matter of a filling material was also touched upon. It was stated that the General Electric Company had found it very essential to the satisfactory operation of a cartridge-inclosed fuse to provide such a filler.

A suggestion was offered that in case fuses renewable by the user were recognized it would be very essential and desirable to standardize the elments. This would make it possible to satisfactorily use the new elements of one maker in the cartridge of another maker.

Prof. H. E. Clifford stated that he had been requested to investigate certain data for the Economy Fuse & Manufacturing Company. These contained the reports of tests on some 3,000 fuses. These tests were conducted on 30, 60, and 100-ampere ferrule and knife-blade types of fuses and no developmental work was included.

The results of these tests indicated that the Economy fuses were in no wise inferior to any of the fuses of other makes which were tested under similar conditions. It was stated that in order to determine the ability of an Economy fuse to operate satisfactorily when refilled they were renewed 50 times and performed successfully.

L. W. Downes, speaking for the D. & W. Fuse Company, said that his company held patents for a fuse readily renewable by the user, but had refrained from placing it on the market. He stated that those representing insurance interests on the committee which prepared the standards for cartridge-inclosed fuses were unanimous in asking that they be made as nearly non-renewable by the user as practicable.

Dana Pierce, D. S. Boyd, H. O. Lacount, and G. S. Lawler were other insurance representatives present, but not participating in the discussion, while C. E. Skinner, of the Westinghouse Electric & Manufacturing Company; C. A. Bates, of the Bryant Electric Company; and A. F. Daum, of the A. F. Daum Company, were representatives of manufacturing interests. Aside from those mentioned several persons whose interests were general in nature were present.

New Fire-Alarm System for New York City.

An appropriation of nearly one million dollars has been made for the installation of a new, modern fire-alarm system for the island of Manhattan. The following statements are taken from a report to the Board of Estimate and Apportionment made by Robert Adamson, fire commissioner, and Putnam A. Bates, electrical engineer.

By discontinuing the use of the old fire-department subways and also the high-tension subways of the Consolidated Electrical Telegraph & Subway Company and by confining the fire-alarm cables to the low-tension system of subways to be supplied by the Empire City Subway Company, the plan will eliminate to as great an extent as present-day conditions of such installations afford the possibility of contact between conductors of fire-alarm systems and foreign circuits containing dangerous voltages.

The plan contemplates an entirely new fire-alarm telegraph system for the Borough of Manhattan by the utilization of such parts of the recent construction as are adapted to the new system, and by the construction of the remainder.

The Borough of Manhattan will have an entirely new fire-alarm telegraph system, modern in every respect, including the cables, fire-alarm boxes, and a new fireproof central station in Central Park.

As planned, only ten street boxes will be attached to any single circuit. Each fire house will be connected with the central office by circuits wholly independent of the alarm-box circuits, a maximum of four companies being connected on any one of these circuits. The fire alarms will be sent to the new central headquarters from the street boxes, and will be thence transmitted to the fire house over the central office circuit. Provision is included, by means of independent circuits, for notifying independently the chief of the department, his under chiefs, all fire-boat stations, and the Insurance Patrol, so that they shall receive all alarms of fire at all hours. In this latter system of circuits will be included a connection with the high-pressure pumping stations, the Edison Company's Waterside power station, which furnishes the current for the pressure pumping, and police headquarters. Wires are also provided in the feeder cables for direct connections with fire headquarters in the Bronx, Brooklyn and Queens. Public schools, hospitals and other similar buildings are also to be connected with the street-box system, each such building having assigned to it one box.

In the preparation of the present plan the principles of engineering, as applied to this problem by J. J. Carty and Kempster B. Miller in their preliminary plan, prepared in 1907, have been closely adhered to, and in the planning of the alterations to the central office building, as well as the apparatus which it will house, it is intended that the same general character of equipment and method of installation shall be employed as was then proposed.

License Law for New York City.

The New York Board of Aldermen has passed an electrical code for the city of New York, which provides for the licensing of all persons or firms engaged in electric wiring, after examination by a license board consisting of seven members. A fee of $10 for the first year and $5 for each subsequent year is required. Special licenses granting a person in the employ of an owner or manager of a building permission to install, alter or repair electrical work are obtainable after examination upon the payment of $1. Permits for individual pieces of work may be obtained in the same manner.

Joint Contractors' Meeting at Kansas City.

The joint conventions of the Kansas and the Missouri Electrical Contractors' Associations in Kansas City, July 10, did not result in consolidation of the associations, but close co-operation was inaugurated, in a practical way. The Kansas Association is represented on a committee appointed to investigate the subject of concentric wiring, and make report of its first-hand discoveries and conclusions, disregarding the information obtained from books and pamphlets. The joint convention discussed the subject at length, but most of those present admitted their lack of accurate knowledge, while doubting the feasibility on general principles. It was suggested that the contractors should prepare themselves to give real testimony on the subject, so that in case opposition seemed advisable, definite objections could be made against the adoption of any orders especially by the national associations approving the installation. The committee consists of Fred B. Adams, St. Louis; L. E. Reed, St. Joseph; J. W. Hutchinson, Kansas City, Mo., and J. E. Bushong, Ottawa, Kans.

The subject of consolidating the two state associations was left in the hands of a committee for further investigation, and especially for conference at the national meeting. The chief purpose of combining, the Kansas members declared, was to secure the assistance for boosting organization work of a secretary, and it was suggested that they might properly elect as secretary A. J. Burns, who acts in that capacity for the Missouri Association. The co-operation of the state associations otherwise than by formal union is assured by the declaration that Kansas and Illinois members will be specifically invited to the Missouri state convention; and that when these conventions are held in Kansas City, special effort will be made to secure the attendance of Kansas contractors. When conventions are held in St. Louis, the Eastern Missourians will make efforts to get Western and Southern Illinois contractors to attend the meetings. One objection to formal consolidation was that one state would thereby lose its director, or would be in danger of doing so.

The Kansas contractors were invited to attend some of the meetings of the Kansas City Association at which jobbers were present—one meeting a month being of this nature—where suggestions might be obtained for obviating the competition of jobbers in the retail electrical trade.

National Association of Electrical Inspectors.

HUBERT S. WYNKOOP, President, 1574 Fiftieth Street, Brooklyn, N. Y.
WASHINGTON DEVEREUX, Vice-President, 131 South Fourth Street, Philadelphia, Pa.
WILLIAM LINCOLN SMITH, Secretary and Treasurer, Concord, Mass.
R. P. STRONG, Representative on Electrical Committee of National Fire Protection Association, 809 Hibernian Bank Building, New Orleans, La.

Executive Committee
J. C. FORSYTH, Chairman, 123 William Street, New York City.

SECTION REPRESENTATIVES:
C. H. Fletcher, George Hubbard, British Columbia.
A. W. Hopkins, G. W. Perry, Western New England.
Washington Devereux, A. H. Lilley, Philadelphia.
E. N. Davis, H. A. Knight, Eastern Massachusetts.
M. L. Pomares, O. E. Smith, New York City.
Arthur Kempston, G. A. Cleary, California.

MEMBERS AT LARGE:
K. W. Adkins, St. Louis, Mo.
Emil Anderson, Minneapolis, Minn.
F. G. Hartwell, Boston, Mass.
J. E. Latta, Chicago, Ill.
James B. McCarthy, Detroit, Mich.
H. G. Veit, Cleveland, O.

"LET THE CODE DECIDE."

Secretary's Message.

The vacation season is now on and presumably many of our members are either on or planning for their vacations. The Secretary hopes that each and all may be as pleasantly situated as he is and enjoy their holidays to the full.

Incidentally, an interesting case of what not to do came to his notice a few days ago. He went into the principal hotel in one of the largest Maine cities, and while reclining in the barber's chair happened to look up at the electric fixture overhead. It was mounted on a steel ceiling, and investigation showed was fitted with an insulating joint and an insulating ring for the canopy. There were seven in all in the room and in the process of renovation a few weeks previously each fixture had been carefully *gilded* and not over the canopy alone, but over the ring as well and right onto the ceiling, where as it was apparently fly-specked about the ring the gilding had been carried out for about a quarter of an inch. Presumably the original paint on the ceiling had been destroyed under these spots, for I asked permission to make a test with a pocket flashlight I had, and found I could burn the light perfectly well between the fixture and a wire with which I scratched through the paint a foot or so from the fixture on the ceiling. The test succeeded on every one of the fixtures. I called the attention of the hotel manager to the facts, and when I left he had a man cleaning the rings thoroughly.

High-Temperature Fixtures.

Question 304. Rule 26 v: A claims that under this rule only such forms of fixtures as in which the temperature exceeds 120 degrees Fahrenheit need be submitted for examination and approval. B claims that all such forms of fixtures, irrespective of temperature, must be submitted, the temperature governing only the type of conductor insulation. Which is right, A or B?

Answer 1(O). Unquestionably both parties to this dispute are wrong. All of Rule 26 relates to *wires*, on inside low-potential systems. Section *v* refers particularly to wires for fixture work, and the sentence under discussion is part of a paragraph describing the proper wire to be used in fixtures operating under high temperature. The sentence, however, does not relate to wires, but requires special approval of the high-temperature fixtures under discussion. The sentence is not germane to the subject of wires, but its insertion in this paragraph can be considered as a timely warning that the high-temperature fixtures under discussion are apt to be hazardous to surrounding material, as well as injurious to rubber-covered wire. The broad question as to the necessity of an approval on fixtures is not generally a Code question, but concerns the conduct and policy of the inspection department. Regarding the dispute, A has no right to assume because high-temperature fixtures are required to be specially approved, that it necessarily follows that no other fixture need be approved. On the other hand, B cannot argue that the requirement under discussion applies to any but the special fixtures referred to.

The matter appearing in this section consists of questions on the National Electrical Code, its interpretation and meaning, and questions as to whether certain methods of wiring are in accord therewith. These questions are gladly received from anyone interested, even if not a member; they should be sent to the secretary with any needed elucidating sketch. They are answered by each member of the Executive Committee according to his knowledge of what the ruling would be in his jurisdiction.

It should be understood that no pretense is made to give an authoritative interpretation of the Code. This is a voluntary association; it has representation on the Electrical Committee of the National Fire Protection Association, which prepares the Code, but it has no right, and claims no right, to give a final interpretation of anything in the Code. It is only intended to give the interpretation which seems correct to the members of the Executive Committee. No attempt is made to edit or correlate the answers from the different members of the Committee, as it is felt that the occasional difference of opinion is calculated to lead to a further study of the matter in question, further discussion and the final clearing up of obscure points.

The aim is to help toward a better understanding of the Code on the part of all; a more uniform conception of its meaning; increased precision in applying it; and harmonious action of those using it, for the common good.

Answer 2(R)*. I personally do not feel that I can submit any information as to procedure under this section.

Answer 3(U). I feel that B is right in his position.

Answer 4 (M). I should say that B is correct.

Answer 5(K).* I consider B is more nearly right.

Answer 6(P).* I side with A. "Such forms of fixtures" undoubtedly refers to those in which the wiring is exposed to temperatures in excess of 120 degrees Fahrenheit.

Answer 7(F and G). We feel that B is right. The last paragraph of the rule plainly reads "all such forms of fixtures must be submitted for examination test" and so forth. This is separate and distinct from the part of the rule which says "slow-burning wire must be used where the temperature is in excess of 120 degrees Fahrenheit."

Answer 8(L). The first six lines of second paragraph, Rule 26 *v*, plainly state what fixtures are to be submitted for approval.

Answer 9(J). B would appear to be correct.

Answer 10(B)*. All fittings, materials, etc., are subject to approval on examination. This holds true of fixtures, which are treated in Rule 77 of the Code. Rule 26 *v* refers to fixture work, and the section specifically referred to by the question appears to me as designed to emphasize the fact that fixtures used under conditions which are not normal conditions, as considered in

the general specifications for fixtures, must be the subject of special consideration by the inspection department having jurisdiction. That is, a fixture which might be an approved fixture for use under conditions where heat to which it is subject is less than 120 degrees Fahrenheit, might not be proper for use under conditions where temperature was higher, unless it was rewired, taking into consideration the special conditions referred to. It also calls attention to certain locations where temperature would probably be in excess of 120 degrees Fahrenheit, as mentioned in section *v*.

Answer 11(T). My interpretation of the last sentence of the second paragraph of Rule 26 *v* is that it is intended to apply more specifically to fixtures of special design for use in show cases and similar places, as outlined in the section.

Answer 12(N)*. I cannot see why this last sentence should be included in the rule in question at all, for this has to do entirely with wires for inside low-potential work.

Moreover, observe that the whole of the second paragraph beginning "In wiring," etc., is an exact repetition of Rule 55 *a*, second paragraph, except that Rule 55 *a* reads "slow-burning wire must be used," while Rule 26 *v* reads "*approved* slow-burning wire must be used."

Further, Rule 77 gives the specification for fixtures, and in section *g*, which is apparently tacked on as an afterthought to section *f*, Test, we find the special requirements for the class of fixtures under discussion.

My opinion, therefore, is that all fixtures to go on approved list must be examined by the laboratories under their system in accordance with Rule 77, and that the provisions under discussion in this question mean that fixtures for this special purpose should be presented *to the department having jurisdiction* before the contractor installs same, in order to see if they comply with the special requirements of 77 *g* (since he might be going to use some fixture on approved list, but not specifically for this location), as well as to see if they need be rewired with the slow-burning wire. B, therefore, is right, the special conditions and probable temperature limit being the reason for the special local examination requirement, and each case being distinct with its own peculiarities within limits.

Answer 13(H)*. The last clause of Rule 26 *v* seems to cover the question. Plainly some one must determine if a lamp is liable to raise the temperature higher than 120 degrees Fahrenheit, and it is obvious that an installed fixture, which has not been locally examined and approved, and did raise the temperature to a dangerous point, would be rather an expensive experiment.

Answer 14(A)*. I should say that the Rule 26 *v* means all forms of fixtures. If you read the first line to comma, then start at the first word after the period it reads: "In wiring certain designs of show-case fixtures, all such forms of fixtures must be submitted for examination." It seems to me that B is unquestionably right.

Inclosing Motors.

Question 305. Rule 8 f, states a preference for inclosed-type motors over wooden boxing about motor. Is it necessary to provide boxing for a squirrel-cage induction motor without commutators, slip rings, or sliding contacts?

Answer 1(O). Squirrel-cage induction motors without exposed live parts or sliding contacts have never been generally required by inspection departments to be of the inclosed type or provided with dust-proof inclosures.

Answer 2(R)*. It is recommended in this vicinity, where deemed advisable by the inspector, to inclose even induction motors of type mentioned, places where foreign matter is liable to become wedged between moving parts, such as coal-crusher work, being an example where good practice would call for boxing.

Answer 3(U). I think the rules cover all motors. The danger is not the burning of the motor, but lighting of inflammable material, in case not only of sparking, but of overheating from poor insulation or other possible causes.

Answer 4(M). I hardly think so.

Answer 5(P)*. The boxing around the motor is more or less a makeshift, as dust will collect within the box. For this reason it is preferable to omit the boxing if there are no sparking conditions.

Answer 6(F and G). Boxing is desirable, as it will tend to keep the motor clean, prevent the accumulation of dirt in the windings, and between the rotor and stator. The air space here is about one-sixty-fourth inch. If the motor is located in a room in which there is dust or lint the air gap is often small enough to become filled with material, sometimes to an extent sufficient to retard the rotor, in which case fire is produced by friction. A case of this kind occurred several years ago in the works of the American Logwood Company, Chester, Pa. The wood dust was exploded, killing several men and wounding others. A law suit followed. The victims and their families were awarded $100,000.

The motor had previously been boxed, the boxing removed, with the result as above stated.

"Safety First" to life and property is a good slogan to tack on to the morning and evening prayer.

Answer 7(L). Common practice is not to box up motors of the squirrel-cage type.

Answer 8(J). I do not think so.

Answer 9(B)*. We should hardly consider it necessary to provide boxing for an induction motor of this type.

Answer 10(T). Under this rule I am of the opinion that an alternating-current motor of the squirrel-cage type should be treated the same as an inclosed type of motor; that is, no boxing required.

Answer 11(N)*. In this jurisdiction it is customary to treat these motors just like any others not completely inclosed. Boxing is required in many cases; it is, however, so easy now to get an inclosed-type motor even of squirrel-cage design that these are usually installed.

Utilities Suffer from Storm in Cincinnati.

The violent storm, accompanied by heavy rain, and reaching cyclonic proportions, which passed through Cincinnati and its suburbs on the night of July 7, caused the loss of more than 30 lives and property damage amounting to not less than $2,000,000. Of this amount, a very considerable part was suffered by the various street-railway, telephone, telegraph and other utility companies in the city, whose wires and poles were blown down and otherwise damaged to an extent which has since interfered seriously with traffic in many instances. The South Covington & Cincinnati Railway Company, operating lines in Covington, Newport and other Kentucky towns, with termini in Cincinnati, was an especially heavy sufferer, while the Union Heat, Light & Power Company, which also does business in the Kentucky towns contiguous to Cincinnati, had its service interrupted by damage to its distribution system. In Cincinnati telephone service was interfered with to some extent, but was by no means crippled, the damage being so distributed as to affect only small sections of the city. Repairs were undertaken at once by the companies involved, and rapid progress toward the restoration of order made.

Public Service Commissions

Conducted by William J. Norton

CALIFORNIA.

The San Joaquin Light and Power Corporation was authorized to issue and sell $1,582,000 of Series "C" six-per-cent, 40-year first-and-refunding-mortgage gold bonds; $300,000 of the bonds to be sold at not less than 94 per cent of the face value, and the remainder at not less than 95 per cent of face value plus accrued interest.

The Pacific Telephone and Telgraph Company, the Glenn County Telephone Company and the Tehama County Telephone Company were granted authority to consolidate their telephone properties in Glenn and Tehama Counties. The new company will be known as the Sacramento Valley Telephone Company, and practically all of the stock will be held by the Pacific Telephone and Telegraph Company.

DISTRICT OF COLUMBIA.

The annual report of the Commission for the year 1914 has just been issued. The Commission states that it has not established rates for service for the various utilities for the reason that rates will depend on the value of properties, and the valuation of the properties has not been completed. The Commission has also taken the position that until the completion of the valuations, additional capitalization should be confined to the least amount possible without embarrassing the utilities in the proper performance of their functions. Appraisals are being made of the Potomac Electric Power Company, Washington Gas Light Company, Georgetown Gas Light Company, Chesapeake and Potomac Telephone Company, Washington Railway and Electric Company, Capital Traction Company, City and Suburban Railway of Washington, and Georgetown and Tenleytown Railway Company. The Commission in its report states that failure of the companies to properly co-operate with the valuation bureau, and the incomplete records have caused delay and increased the cost of the work. Attempt is being made to determine the original cost as well as the cost of reproduction new.

IDAHO.

Pocatello Water Company. The Supreme Court has handed down a decision reversing the order, issued by the Public Utilities Commission, directing the Pocatello Water Company to reduce its rates and make certain improvements in its service. The court found that the Commission had erred at several points in computing the value of the property; and the court further deemed it unwise to order improvements in service at this time as it had not been shown that the company has a valid franchise in the city of Pocatello.

The Commission had refused to consider the present actual value of the company's water right, except in the sum of $2,000 which had been expended in the original purchase. The Supreme Court ruled that the water right should be considered at its present reasonable value.

The Supreme Court also directed that evidence on behalf of the proprietor of a public utility that certain expenses have been incurred in building up the business may be considered by the Commission as one of the elements of value, under the head of "going concern value." On that point the court said: "The fact that it is a going concern, in successful operation, should be considered in estimating the value of the physical property and assets, but the Commission should not attempt to calculate or segregate any specific theoretical value which might attach to the plant or system merely by reason of the fact that it is a going concern."

In determining the value of a utility for the purpose of fixing rates, the court held that the "cost of reproduction less depreciation" is the correct general rule to be applied. When deduction is to be made for depreciation, the court ruled that only actual tangible depreciation, and not theoretical, or "accrued depreciation" should be considered, and that if it is shown that the plant is in good operating condition, giving on the whole as effective service as a new plant, the question of depreciation may be disregarded.

The court remanded the case with instructions to the Commission to proceed further in accordance with the views expressed in the court's opinion.

KANSAS.

Postal Telegraph Company. The Kansas Supreme Court has ruled that under the law creating the Commission no public utility under its jurisdiction could discontinue service without first obtaining permission from the Commission.

The Postal Telegraph Company closed its Syracuse office on the ground that it was being conducted at an annual loss. The action was taken without obtaining permission from the Commission, and the attorney for the Commission brought mandamus proceedings to compel the reopening of the office. The court temporarily postponed issuing the writ.

NEW HAMPSHIRE.

Report of Decisions. The report contains the formal and informal cases decided by the Commission during the year ending August 31, 1914. An index-digest is given covering all decisions of the Commission published since its organization in 1911, which have been published in Vol. I to IV, inclusive.

NEW JERSEY.

The Public Service Corporation of New Jersey has secured a writ of appeal in the 90-cent gas case, carrying the case to the United States Supreme Court.

NEW YORK—Second District.

The Ulster and Delaware Railroad. The Commission has refused the petition of the railroad for authority to increase its mileage-book rate from two to three cents a mile. The decision of the Commission is an interesting one as the petition brought out a full discussion of the power of the Commission under the Public Service Commissions Law to increase a rate above a maximum rate set by the legislature.

Chairman Van Santvoord in the majority opinion concurred in by Commissioners Hodson and Irvine, points out that should the Commission assume that the power to permit such increase had been delegated to it by the passage of the Public Service Commission Law, not only the mileage-book law involved in the present case, but such other statutes as the three-cent-maximum-fare law, possibly even the eighty-cent gas law for New York City, and other similar enactments might be in effect repealed by the

Commission's decisions. In an extended review of all the statutory sections involved he fails to find that the Commission, either expressly or impliedly, has been granted such power.

Commissioner Emmet and Commissioner Carr dissent. Mr. Emmet, in a review of the circumstances surrounding the passage of the Public Service Commission Law, holds that had not the legislature intended to take the rate-making power out of the "often bungling" hands of the legislature and place it for expert determination absolutely in the jurisdiction of the Commission the whole battle of Governor Hughes for the regulation of public utilities would have been vain. As the power to lower rates irrespective of legislative enactment is expressly granted in the Public Service Commissions Law, Mr. Emmett finds that the power to raise rates is implied beyond reasonable doubt. Were this power to raise rates to afford a reasonable return on investment in accordance with the facts disclosed in each case not implied, Mr. Emmet holds that the intent of Governor Hughes and of the legislature which passed the law would have been anything but the distribution of even-handed justice, to the railroads as well as to the public.

The Supreme Court of Missouri, as quoted in the opinion of Commissioner Carr, has held that the Public Utility Commission of that state, by a statute delegating to it the rate-making power in the same words as does the Hughes law, was empowered to set aside the two-cent fare law of that state. He holds that the "mileage-book law" of this state is in effect but a legislative guide for the railroads which come under it until the rate which it prescribes can be passed upon by the Public Service Commission.

Chairman Van Santvoord in his opinion says, "to fix rates is a purely legislative function, the power to exercise which is not to be lightly assumed although actuated by whatsoever lofty motives in the rounding out of an ideal. While it is not to be denied that the legislature has power to delegate such functions such delegation should be in express terms and not by implication—or at least by an implication so undeniably manifest as to be the substantial equivalent of express declaration. As for the suggestion, so gravely urged, that the Commission 'ought to have the power' invoked, it might be considered in point if we were discussing the question of what constitutes an ideal regulative law, in the abstract. But the concrete question before us is not what the legislature ought to have done, in formulating the Public Service Commissions Law, but what it actually has done and precisely how far it has gone in delegating certain of its law-making functions to a regulative department.

"In deciding that question we are not to be controlled by considerations of policy, by general propositions in ethics, or by accepted ideals in law making. The scope and meaning of a statute of this kind, if unfortunately lacking in either the science of ideal humanity or that other kind of ethics which Kant terms 'pure morals,' is not to be eliminated by the precepts of the Sermon on the Mount. There is no rule of statutory construction which directs us to explore the labyrinth of legislative intent by the light of the Moral Law. There are even people who believe that the legislature has been known to enact laws which really 'ought' not to have been made. But howsoever plain such a case may seem, it will be a sorry day for our scheme of government when a department created by the legislature shall assume to construe its statutory powers by abstract propositions of right and wrong as bearing upon a particular legislative act, rather than by the ordinary rules of law."

Commissioner Emmet in his dissenting opinion says: "The so-called Hughes Law of 1907—which, with slight changes is the law under which we are acting today—was a courageous and comprehensive effort by earnest men to deal with a great and complex problem in a spirit of fairness to all the interests involved. If my associates are right in their view, we now have upon our statute books precisely the kind of a law which the framers of our present regulatory system were obviously doing their very best to get away from. That is to say we have a law which, in dealing with the delicate problem of railroad rates, permits of no really discriminating exercise of judgment by the Commission, but instead perpetuates all the old evils of clumsy and ill-considered legislative domination—this in relation to the question which, of all others connected with the business of railroading, most requires expert handling if it is to be settled with any degree of fairness or justice. We have a law which only takes one side of a complicated problem into account and only aims at giving relief to one of the classes of people interested in the proper solution of this problem.

"If it was really the intention of the legislature and Governor Hughes to give us such a law as my associates seem to think the present law is, then it was apparently their intention that these Commissions should really be very much the sort of public bodies that certain demagogues have always said they ought to be—bodies organized not primarily for the purpose of dispensing even handed justice as between the corporations and the people, but organized primarily to give an odor of sanctity and a color of right to repressive attacks upon private capital and enterprise engaged in the public-utility field."

Upon the question of the legislature's right to go over the heads of the Commissions and fix rates for public utility corporations, Mr. Emmet points out that every governor since 1907 has vetoed such rate bills when they were passed holding, that the intent of the Public Service Commissions Law was that all rates should be fixed by the tribunals there created.

"The keynote of the whole scheme was completeness in the jurisdiction of the Commissions over whatever regulatory functions were entrusted to them at all," Mr. Emmet says of the Hughes Law. "It was intended that the Commissions should, in the interest of careful and scientific handling, deal with this subject as the sole representative of the state of New York.

"I do not mean to say, of course, that when the law was passed the legislature consciously and permanently divested itself of all rights to intervene in the future in rate-making cases. It at least indicated a plain intention not to exercise this right again until the newly created regulatory machinery had been tested.

Mr. Emmet concludes his opinion as follows:

"I am not partial to the idea that governmental officials should ordinarily seek to read larger powers for themselves into the law than are explicitly stated there. The tendency should be in the other direction. But here, it seems, the whole underlying purpose and spirit of the Public Service Commissions Law is at stake—imperilled by what I can only regard as a trivial technicality. In such a situation the Commissions themselves should certainly—whatever the courts do afterwards—construe doubtful points in the law in accordance with what they know to be the underlying spirit and purpose of the law. I feel that we are not, as a Commission, doing our full duty when, through an excess of lawyerlike caution, we invoke narrow and technical principles of statutory construction as a reason for refusing to perform an act of simple justice to a railroad corporation—merely because the wording of the law is, at worst, slightly ambiguous, although the spirit of the law is plain."

Commissioner Carr, also in a dissenting opinion, says:

"In my opinion Section 40, read in connection with sub-division 4 of Section 33 of the Public Service Commissions Law, gives the Commission

the power to increase mileage-book rates notwithstanding the provisions of Section 60 of the Railroad Law (mileage-book law) and that this latter section was left unrepealed for the specific purpose of providing that the mileage-book rates therein set forth should be the prevailing mileage-book rates for new railroad corporations subject to the act in the first instance but that such rates should nevertheless be subject to an increase by the Public Service Commission if, after investigation, it should determine that the rates ought to be increased. The trend of the times being to give the Commissions full power to regulate the corporations under their jurisdiction, and this includes the fixing of fair and reasonable rates, I cannot agree that the legislature of the great State of New York has withheld from this Commission the power to fix a mileage rate for a railroad corporation in this state which will aid it in performing the service which is required by the public."

OHIO.

Annual Report. The second report under the organization of the Public Utilities Commission has been issued, containing decisions issued during the year and statistics for the companies under its jurisdiction for the year ending June 30, 1914.

OREGON.

Bend Water, Light and Power Company. Upon petition of the City of Bend, the Commission made an investigation to determine reasonable rates for water and electric service of the Bend Water, Light and Power Company. The Commission found that, from the records available, it was impracticable to determine the original cost of the property. The reproduction cost new of the property, lessened by depreciation, was found to be $84,118, as of December 31, 1914.

The Commission makes the following holding in regard to certain property not at present "used and useful."

"Over and above the plant reasonably used and useful in the production of electricity, the defendant has installed and owns other physical electric production equipment and land, to reproduce which, in normal new and usable condition, would have required on December 31, 1914, the expenditure of approximately $47,500. Such electric production equipment and land, although its construction and acquisition was apparently warranted by good engineering practice and business management, was not justified in the realization of expectations and the Commission finds is not now reasonably used and useful to the community served. The amount of capital represented thereby should be carried into Account 105, of the Commission's Uniform Classification of Accounts, 'Property Devoted to Other Operation,' there to remain until such time as the defendant shall show the Commission that such property, either in whole or in part, is devoted to the accomplishment of the principal purposes of the business of the utility, at which time the Commission will determine, and by its order fix the amount which shall be credited to such account which shall be charged into the fixed capital account, and make such other and further order as may be proper in the premises."

The Commission finds that the present rates yield 11.5 per cent on the fair value of the property of the electric utility. These rates are higher than rates in effect for such service in other towns and cities of like population and "the rate of return yielded thereby is greater than the rate of return ordinarily expected and received on investments generally, and in the particular class of utility service in which the defendant is engaged."

Lower rates are ordered.

Among the Supply Men

Novel Method of Shopping.

There are two very common ways of shopping, either by going personally to the store, or by telephoning the order to the store. A novel combination of these two methods has been worked out successfully at Newark, N. J. Experts in selling goods to the public often say that if a dealer can only get people inside his store, he will sell goods. That is why so many bargain days are conducted. People come for the bargains, but also buy other goods. Just to try out the psychology of this claim, Benjamin Hurd, the Western Electric Company's local manager at Newark, decided to find a way to sell goods and take orders without his customers coming inside at all. An increase in sales at this supply store, which is at 64 Park Place, has resulted.

Here is the way Manager Hurd has worked out his new electrical seller: A desk equipped with order books, Interphones and electrical devices has been placed just inside the window. One of the office force, H. M. Burnett, sits at the desk in plain view of the passing throngs. He is a very busy young man. His desk telephones are connected up to lines which reach to the outside. A customer comes along, sees some electrical appliance that he needs, picks up the outside Interphone, speaks quickly to the clerk in the window, who is there to take down orders, and asks the clerk for further details about cost, etc., of devices in the window. Usually a crowd stands about waiting for a chance to ask questions. Addresses are obtained and a mailing list improved by the arrangement.

Intermoutain Electric, of Salt Lake, Branches Out.

The Inter-Mountain Electric Company, of which C. B. Hawley is president and general manager, has purchased the stock and business of the Bertram Motor Supply Company of Salt Lake City, and is adding an automobile supply department to its rapidly expanding business. Finding its present quarters too small, the company has leased the entire frontage of the Newhouse Block on Fourth South Street between Main Street and State Street, having a total frontage of 125 feet, and a floor space of 11,375 square feet. It will occupy the new quarters on August 15. In announcing the proposed extension by his company, Mr. Hawley says: "We have been conducting a motor supply department in connection with our electric business for some time and find that it fits nicely with our electric supply business. Our salesmen who cover the intermountain territory regularly can handle this business without any conflict with their electric line. Our new location is practically the automobile center of Salt Lake City and we will be admirably equipped to take care of our automobile and electric supply business."

Questions and Answers.

All readers of the Electrical Review and Western Electrician are invited to submit questions and answers to this department. Full names will not be printed except where the writer indicates his willingness therefor. Anonymous communications will not be considered. Questions relating to electrical matters of any kind will be inserted. Answers from our readers should be received in this office preferably within ten days of the date of publication of the question, and will be published in a subsequent issue. Payment will be made for all answers published.

Questions.

No. 292.—Sunspots, Magnetic Storms and Weather.—A short time ago a statement appeared in the newspapers that an exceptionally brilliant display of the aurora borealis was connected with great activity in the sun spots and that it also produced serious disturbances on telegraph circuits and magnetic compasses and accounted for our prolonged rainy weather. Has any definite conclusion been reached by astronomers, meteorologists and other scientists as to the interconnection of these phenomena? Is there any basis for ascribing an electrical or magnetic relation between them?—F. L., Beloit, Wis.

No. 293.—Bell-Ringing Transformers and Lightning.—Recently we installed several bell-ringing transformers and a number of them have already been burned out during a lightning storm. Is there any simple and yet positive way of protecting them against lightning? We will be much pleased if some one will answer this through your Questions and Answers columns.—H. P., Hillsboro, Ill.

No. 294.—Alarm for Air-Blast Transformers.—A railway substation has a bank of air-blast transformers that are now unprotected against failure of the forced ventilation at times of heavy load. What is the simplest and most reliable alarm system for this purpose?—N. P. C., Indianapolis, Ind.

No. 295.—Supply Voltage.—Is it customary in the franchises of electrical central-station companies to stipulate what the supply voltage shall be for residence and power customers, or is this left to the option of the company?—K. F. T., Cheyenne, Wyo.

No. 296.—High Cost of Rendering Bills.—I understand that in the case of some of the large central-station companies it costs on an average from 16 to 18 cents to render the ordinary monthly bill for current used. What is the reason for this high cost? What efforts have been made to reduce it?—D. L., Chicago, Ill.

Answers.

No. 286.—Static in Press Room.—In the press room of a large printing establishment much trouble was experienced during the dryest part of last winter from static electricity causing paper sheets to stick. Attempts were made to take the static from the driving belts, but without entirely relieving the trouble. A suggestion was made that a humidifying apparatus be put in to keep the air more moist, it being claimed this would immediately stop the trouble. Is this a reliable solution? If not, what is the best way to get rid of the static?—C. A. C., Omaha, Nebr.

Humidification will, to a considerable extent, relieve you of trouble due to static electricity, the results depending upon how much humidification your work and product can stand. In any case it is not necessary to humidify the room air up to the point of saturation, i. e., the point where condensation of water appears. If sufficient moisture is present, the static will be diffused or dissipated instead of being retained on the surfaces charged. The writer's experience embraces five years' study of this interesting subject in the paper and textile fields. The theory that a metallic collector usually employing a series of points similar to a comb installed near the charged surface, preferably near where the static is generated, and connected to earth by a metallic conductor will discharge the surfaces by virtue of the earth being at zero potential does not work out satisfactorily in practice, because it is impossible to discharge static completely in this manner when its potential is below 4,000 volts. In the case of a fast-moving belt the potential generated is considerable and is dependent upon the speed and friction and, as the quantity depends upon the area, this factor is usually low. In your case, however, the friction and speed are not very great, but the area presented by the paper surface is relatively great. Consequently, the charges experienced are of low potential and of considerable quantity. There is a device on the market, known as the Chapman Neutralizer, made in Portland, Me., which is designed to neutralize static charges by producing an alternating-current field, and is based upon the theory that an intentionally generated impulse of one sign has an affinity for, and will neutralize, an impulse of equal quantity and of the opposite sign; charges of both signs are produced by the device, it being alternating, thus charges of both signs are neutralized. This device has a peculiarity which, for lack of a better term, might be called a suction effect and, therefore, affects low-potential as well as high-potential charges.—M. K., Passaic, N. J.

Apparatus for overcoming this difficulty is manufactured by the Chapman Electric Neutralizer Company, Portland, Me. This apparatus is not very complicated, but must be handled with care after being installed, owing to the high voltage used for this purpose. It is possible that the humidifying apparatus would aid to a certain extent, but the above equipment is by far the most practical way of solving the problem.—G. W. C., Roslindale, Mass.

No. 287.—Powdered Coal as Central-Station Fuel.—Recent experimental trials with powdered coal as steam-boiler fuel are said to have given almost ideal results from the standpoint of combustion efficiency. Has this fuel been tried on any extensive scale under the boilers of any large or medium-sized central station? Is the method applicable advantageously to all kinds of coal? Is the cost of the crushing plant offset by the increase in efficiency?—B. A. M., Toledo, O.

The use of pulverized coal as a fuel is not new. As early as 1831, J. S. Dawes used it in England, in a blast furnace, by injecting it with the air through the tuyeres. Though powdered coal is used to some extent today for steam-raising purposes the amount so used is relatively very small. The chief use of this kind of fuel is in industrial and metallurgical furnaces. For the last 20 years powdered coal has been used as a fuel by cement makers and probably four-fifths of the cement manufactured today is calcined in furnaces using this kind of fuel. About ten years ago the experimental use of powdered fuel in metallurgical furnaces was begun and has proved commercially successful in furnaces for heating and puddling and for the basic open-hearth processes. For this service it is rapidly gaining in favor.

It is more than 20 years since work was begun on the adaptation of this method of using coal to the firing of steam boilers but the process seems to be still in the experimental stage. During these years many patents have been issued for powdered-coal apparatus and one of the most important devices brought out seems to be the Bettington steam boiler. This boiler was designed to overcome the difficulties encountered when powdered coal is burned under ordinary boilers. These troubles have been chiefly due to the intense heat produced destroying the brickwork of the furnace, and the ashes being carried up with the flue gases filling up the flues. A test of pulverized fuel with this type of boiler is reported in the *Proceedings* of the Institution of Mining Engineers of England, Vol. 43, pages 112-121. In this report it is shown that pulverized fuel lends itself to high thermal efficiency, smokeless combustion, quick steaming, flexibility in output, small ground space, elimination of banked fires, and the use of low-grade fuels. In this plant, supplying power to a colliery and developing about 600 horsepower when operating at approximately 85 per cent of its normal capacity, 9.6 pounds of water was evaporated per pound of dry coal and the thermal efficiency of the boiler was 76.43 per cent. The largest power plant using pulverized coal of which I can find any record is the Lake Waterford power house of the Dominion Coal Company, of Nova Scotia. This plant is also equipped with Bettington boilers.

The powdered-fuel method of firing is applicable to nearly all kinds of coal,

but most authorities agree that the coal should contain 20 per cent or more of volatile matter and have a very low moisture content. One of the greatest advantages claimed for this mode of firing is the ability to use fuels high in ash. H. R. Barnhurst says (*Bulletin* American Institute of Mining Engineers, December, 1913) that he has successfully used fuels containing 52 per cent of ash. In an article in *Engineering News* for February 19, 1914, Prof. R. C. Carpenter, of Cornell University, says that he doubts very much whether the cost of properly pulverizing the fuel would be warranted by any increased efficiency which could be obtained above the efficiencies now secured with stokers. He estimates the cost of a complete pulverizing plant capable of grinding and feeding 100 tons of coal per day at from $15,000 to $20,000, which is much more than stokers of the same capacity would cost. In this same article the cost of the drying and pulverizing operations in the large cement plants is said to run from 30 to 75 cents per ton. This agrees very well with data given by other authorities. An examination of the many articles on this subject which have appeared in technical papers during the past three years indicates that Professor Carpenter has expressed the general consensus of opinion. The only case where satisfactory operation extending over a considerable period is recorded is that of the English plant mentioned above, which had been in operation 19 months when the article referred to was written. It should also be borne in mind that this coal dust forms a highly explosive mixture with air. This has led some cities to pass restrictive ordinances limiting the use of this fuel. As a large part of the ash contained in the coal goes up the chimney and floats away to settle on the surrounding district the dust nuisance would probably also arouse much antagonism if a large plant were located in a city. At present the most promising field for the use of powdered coal for steam raising seems to be in locating the plant at the mine where it can utilize the low-grade fuels which have no market value, the energy being electrically transmitted to the point where it is to be utilized.—F. E. V., Madison, Wis.

No. 288.—Brush-Brass Finish.—Kindly explain through the Questions and Answers Department, how the brush-brass finish now so popular on fixtures is applied. Why is it not so durable as polished brass? What conditions affect the durability and value of this finish?—G. C. N., Terre Haute, Ind.

For this finish the so-called "low brass" which contains four parts of copper to one part of zinc has the desirable greenish color so much admired for this finish while the "high brass," containing two parts of copper to one of zinc, gives a yellowish color that is not so pleasing. The "low brass" is more expensive than ordinary brass and is not so stiff, so it is often desirable to use common brass as the foundation and plate it heavily with the low brass so as to combine the wearing quality of the one with the finish of the other. The method of producing the brush-brass finish is the same for plated or cast brass and consists simply of the production of innumerable fine scratches upon the surface, all running in the same direction. If the lines do not run in the same direction, or if they are too coarse, or some are deeper than others, the effect is not satisfactory. Various types of abrasives and wheels have been used, but the most satisfactory method has been found to be the use of pumice of the proper fineness, on a wet tampico wheel or scratch brush running at a slow speed. The use of oil or grease in producing the finish is not recommended as it necessitates a subsequent extra cleaning.

The first step in producing a satisfactory brush-brass finish is to obtain a good surface on the article. This is done exactly as if the piece was to be buffed to a high "color." In other words, all scratches, dents and pits must be removed by the use of a buff and tripoli. It may seem unnecessary to remove all scratches or roughness when the surface is again to be scratched, but it is necessary because for the brush-brass finish all the scratches must be of the same character. If some are deep or coarse or they vary in direction, the effect is injured. Having obtained a good surface the brush-brass treatment may then be given. This is done by means of a small tampico wheel. One from three to five inches in diameter and running at from 300 to 500 revolutions per minute will be found satisfactory. If allowed to run too fast, the pumice and water will be thrown off the wheel. The best material for a fine brush-brass finish is F. F. pumice. This is mixed with water to a paste and applied to the wheel. The work is held against the wheel and the scratches allowed to run in the same direction, generally lengthwise of the article to secure the best effect.

As soon as the brushing is finished the article is ready to be rinsed, dried, and lacquered, care being used to avoid abrasion or staining. Lacquer manufacturers now make a special grade of lacquer for this class of work. The choice of a lacquer is important for a lacquer not adapted to the work may spoil an otherwise excellent job. If the articles are allowed to remain for some time after the brush-brass treatment has been given before lacquering they frequently stain. This stain can be removed by dipping the articles in muriatic acid or cyanide solution. The muriatic acid is recommended, as it will not cause spotting-out, which the cyanide frequently does. The muriatic acid dip is composed of two gallons of water to one of muriatic acid. This will usually remove any slight stains and if a stronger dip is needed it can be made by dissolving one pound of cyanide in one gallon of water. After using one of these dips the piece must be rinsed, dried and lacquered.

Polished brass having a hard smooth surface is not so easily abraded as the scratched surface of the brush brass and an abrasion is also not so conspicuous; hence the greater durability of the polished brass.—F. E. V., Madison, Wis.

No. 289.—Combination Electric Radiator.—I have just heard of a newly patented electric radiator which resembles a hot-water radiator and has an electric coil heat the water in the pipes; it is said to be more economical than a straight electric radiator. I fail to see this and would like to have it proven.—W. T., Cleveland, O.

There are two reasons why the combination radiator described may be more advantageous in some cases. First, it has a larger radiating surface; second, it has a much larger heat-storage capacity. Where it is desired to warm a medium-size room to a moderate temperature, it is necessary to have a greater heat-radiating surface than most of the electric radiators consuming less than 1,000 watts possess. The use of the auxiliary water coils provides the necessary moderate-temperature surface to give a better heat distribution through air convection currents than is possible with the restricted high-temperature surface of the ordinary electric radiator. More important, however, is the heat-storage property of the combination outfit. If it is desired to use the radiator for providing a practically uniform room temperature throughout, or most of the day, the heat-storage principle becomes valuable, because it permits using a relatively low current at all off-peak hours and shutting it off entirely during the time of the central-station maximum load, so as to get a much more favorable rate than is possible where the current may be used to any amount and at any time for direct heating. The low rate obtained by the excellent load-factor and off-peak character of such a load will greatly diminish the operating cost and quickly make up for the higher first cost of the combination radiator over the straight electric. In Norway efforts are being made to load up some hydroelectric systems with electric house-wiring equipment employing the heat-storage principle so as to fill up the large valley in the load curve due to comparative scarcity of power load, except on systems with electrochemical load. While the efficiency of such heat-storage radiators may be very slightly lower than that of the straight electric, the net economy under these conditions is decidedly higher.—J. S. C., Seattle, Wash.

ELECTRIC WELDING.—I.

By Gordon Fox.

Welding, as a means for combining the component parts of devices or structures, is gaining in prominence. The limitations of blacksmith welding have long been realized, but autogenous and electric welding processes are opening new fields. As knowledge of the art increases and processes are developed we shall probably see welding in various forms employed more extensively.

Electric welding presents a promising field both for the manufacturer and for the central station, but a goodly amount of application engineering is required in adapting it to special cases. In the welding field there are different classes of work which can be accomplished best by different means. Electric welding does not replace blacksmith welding except in isolated cases. Electric welding does open new possibilities of its own. It accomplishes results which a blacksmith cannot attempt. The field for electric welding lies largely in developing practical ways and means of applying new methods.

There are two distinct electric welding processes, namely, arc welding and incandescent or resistance welding. We will consider arc welding first. There are a number of similar arc welding methods, the most common being the Bernardos process and the Slavianoff process.

For electric arc welding, one terminal of a source of direct current is connected to the article to be welded. The other terminal is connected to an electrode held in the hand of the operator. An arc is drawn by touching the electrode to the article, thus establishing the current flow, then withdrawing it a short distance, striking and maintaining the arc. The heat of the arc fuses the metal at the point of welding. This metal unites with that adjacent to it, and, upon cooling, forms a solid piece.

In the Bernardos arc-welding method the electrode manipulated by the operator is a carbon pencil. These pencils can be obtained in sizes from 0.25 to 1.5 inches in diameter and 6 to 12 inches long, the size depending upon the nature of the work. Uncored graphitic carbon is best for the purpose. Special pencils for welding work can be purchased from carbon manufacturers. Long pencils are usually clamped near the working end to reduce resistance within them. The pencil should be ground to a point and should be maintained fairly sharp so that the position of the arc can be better controlled. This carbon is held in an insulated holder fitted with a hilt or shield to protect the operator's hand. Fig. 1 shows a typical holder.

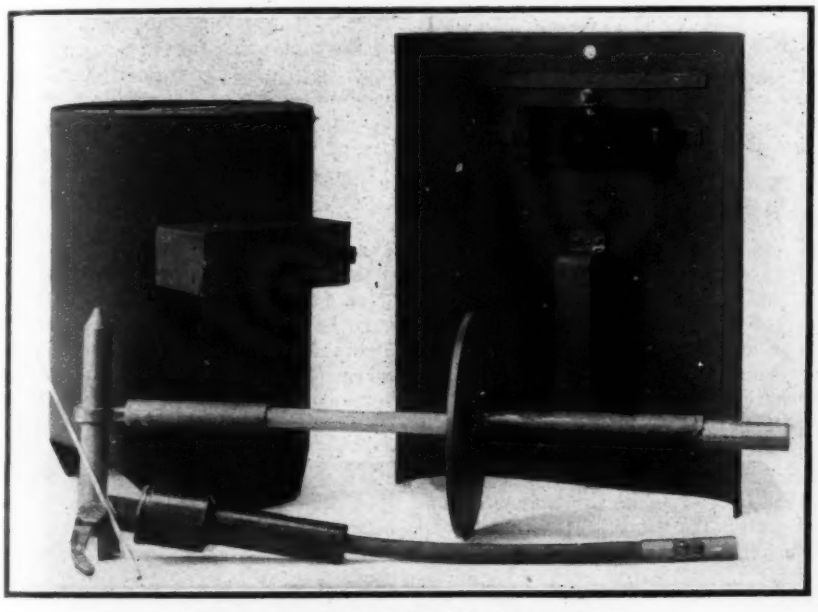


Fig. 1.—Accessories for Electric Arc Welding.

Since the arc is very dazzling in intensity, it is necessary to provide the operator with a shield or hood. It is injurious to look at the arc except through heavy glasses, a combination of red and blue glass being most effective in reducing the violet rays while still allowing the operator to see the work. The arc also has an effect like sunburn upon the skin. The operator should wear heavy gauntlet gloves and use a screen or hood for the face. The illustrations show this protective apparatus.

The other equipment required, aside from a proper source of current and a means for controlling it, are a suitable inclosure for the work, bars of filler material, fire clay or asbestos for molding and damming purposes, and a good flux. These requirements will be discussed in order.

The electric power, which must always be direct current, may be obtained from available power lines of suitable capacity or from a special motor-generator set. About 50 volts is required across the arc and it must be possible to short-circuit the arc without causing too severe a rush of current from the feeder circuit. The current required for welding by the Bernardos method depends upon the nature of the work, amounting usually to 300 or 400 amperes, or more upon very heavy work. If power is taken from 110-volt or 220-volt direct-current mains it is necessary to insert a resistance in series with the arc. This resistance serves the double purpose of reducing the arc voltage and preventing a heavy short-circuit current when the pencil is placed against the work to draw the arc. It is then a balancing resistance. The resistance may be in grid form or a water barrel may be used, the latter arrangement being more flexible and easily obtained. Fig. 3 shows the connections for this method.

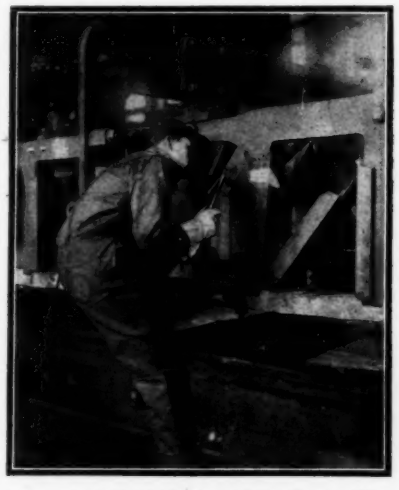


Fig. 2.—Repairing Crack in Locomotive Frame.

In the Bernardos process it is desirable to make the piece to be welded the positive side of the circuit. This is done because the positive side of the direct-current arc is the hotter side, about 80 per cent of the heat of the arc occurring at this point. This arrangement therefore concentrates the heat upon the casting where it is needed.

If only alternating current is available for the welding work, a motor-generator set is required. The use of such a set is also warranted for use upon 220-volt direct-current circuits to

reduce the voltage, provided work is done continuously. There is a considerable power loss in reducing from 220 volts to 50 volts by the resistance method. The motor-generator set does not do away with resistance altogether. The generator is usually wound for 75 volts and a series of resistance grids is placed in series with the arc as a balancing means and to cut down the short-circuit current. The connections of the generator and welding outfit are shown in Fig. 4.

It is desirable that arc-welding work be done in an inclosure so that passers by will not be blinded by the dazzling light. Also, the arc is very sensitive to air currents and will be blown out by a draft. It is difficult to direct if blown about. The welding room should be provided with some form of heating furnace for annealing or preheating work before welding, as will be later mentioned.

Arc welding by the Bernardos process requires the use of a filler bar to be melted into the weld. The filler may best be of Norway or Swedish iron when the work is a steel casting. Upon cast or malleable-iron work either of the above may be used, or it is permissible to use copper wire or rods of special cast iron high in silicon. The filler bar should be 0.1 to 0.5 inch in diameter according to the nature of the work. Sections about three feet long are most easily manipulated.

It is not always considered necessary to use a flux when welding steel or wrought iron. It is almost always used when welding cast iron, however, Borax alone makes a good flux. A little better perhaps, is the flux consisting of red oxide of iron (F_2O_3) about 20 per cent, pulverized borax 80 per cent. The fluxes may be used either dry or wet. The most satisfactory results are obtained by making a paste of the flux and coating the filler rods with this paste. As the rods are melted into the weld the flux is thus automatically and proportionately introduced.

In preparing to weld, the casting or object piece is laid upon or clamped to the welding table in such a manner that a good contact is obtained. The point of welding should preferably be at the top. If it is not possible to secure good contact by simply laying the piece upon the table, the lead may be clamped directly to it. The point of welding should be properly cleaned and shaped. If a joint is to be made between two parts it is best to recess them to form a groove at the weld, into which the filler may be fed. If a crack is to be repaired it should first be chipped out to a V shape. If it is difficult to prepare for the weld by chipping, the surface scale

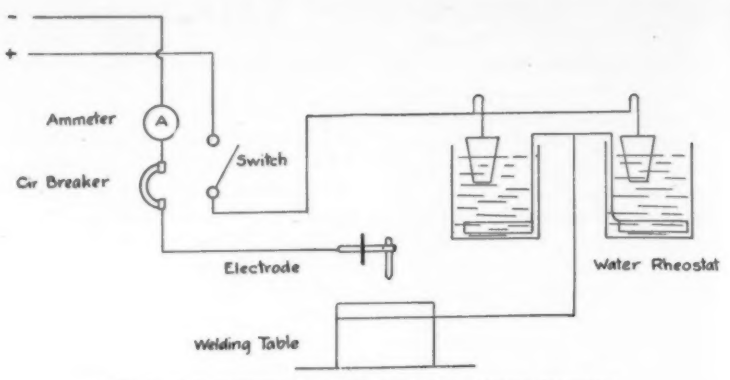


Fig. 3.—Connections for Welding Using Water Rheostat.

and dirt may be removed by first burning away this metal at the point of the weld with the piece tilted so that impurities will run off. The piece may then be tilted back and the welding started. When two pieces are to be welded together they must first be carefully alined and clamped into position in such a manner that in heating they will not become dislodged. If it is desired to "build up" metal, such as a lug, upon the piece, it is usually necessary to form a mold to retain the metal as it is melted and fed into the weld. Fire clay or asbestos may be used for this purpose. If thin plates of metal are to be welded, the intense heat of the arc is likely to "burn through" unless the thin metal is backed up by something to carry away the heat. Therefore, thin pieces should be clamped against larger blocks when preparing to weld.

All being in readiness, the arc is sprung. The arc should be as long as possible, two or three inches being the usual length. Too short an arc concentrates the heating too much and also tends to cause a harder weld. Inability to maintain a long arc is an indication of too much series resistance. The arc is given a rotary motion over the surface of the piece in order to cause uniform, distributed heating. When a melting temperature is reached the filler bar is brought into play, being slowly fed into the weld just as solder is fed into a joint. If the filler is not coated with flux it is necessary to shake a little flux into the weld from time to time. After the welding is stopped the new metal must be thoroughly hammered in order to prevent sponginess and the presence of blow holes. If possible, the work should be done at one continuous heating in order to prevent the formation of oxide upon the surfaces. If this is not possible the oxide may be removed with a wire brush or similar means.

Considerable difficulty is sometimes experienced in arc welding due to cracking while the piece is cooling. The crack is most likely to occur at the weld, although it sometimes occurs at an adjacent weak section. Cracking may be caused by a dirty weld, an oxidized weld, too hard a weld due to carbon from a short arc, the weld being unable to withstand the shrinkage stresses incident to cooling. Even a perfect weld may be unable to withstand these cooling stresses, particularly if the weld be at an unfavorable point. Shrinkage cracks at weak sections near the weld are not uncommon. For such work it is desirable to preheat the piece to be welded, in a muffle or temporary furnace, to a dull red heat. The welding is then performed and the piece allowed to cool slowly. It is sometimes best to leave the piece in the muffle while proceeding with the welding.

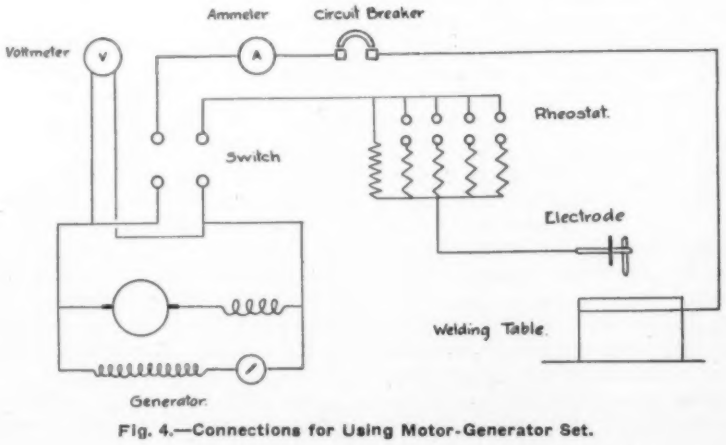


Fig. 4.—Connections for Using Motor-Generator Set.

The Slavianoff or metal-electrode process of arc welding is similar in most respects to the Bernardos process. A metallic pencil replaces the carbon electrode, the pencil being manipulated in the same general manner. As the welding progresses the metal pencil is melted away and fed into the weld. No filler bar is required.

The arc for this method of welding is very short, from one-eighth to three-sixteenths inch in length. The voltage at the arc is less than for the Bernados system, being from 25 to 30 volts. The current runs from 125 to 200 amperes, according to the size of the pencil and the nature of the work. As in the Bernardos system, the pencil is connected to the negative terminal, concentrating the heat upon the object piece which forms the positive terminal. The arc is less intense with this method, but a hood or screen is still required, together with protection for the eyes and skin. The electrodes or pencils should be of Norway or Swedish iron, one-eighth to one-quarter inch in diameter, the smaller size for lighter work, lengths of about 12 inches being most convenient. Some welders use steel pencils when welding steel. Both methods have been successful at different points, the best material being as yet a matter of personal preference. The same fluxes are used for welding by this method as were mentioned in connection with the Bernardos method. The most convenient way to introduce the flux into the weld is by coating the pencil. In overhead welding the coating around the pencil is of advantage in retaining the molten metal at the tip.

The procedure in welding with a metal electrode is similar to that utilizing the carbon electrode. Considerable skill is required to maintain the short arc necessary. A steady hand is required, the arm being best supported. Care should be exercised that the pencil and the piece where being welded are both melting hot and of about the same temperature. Lengthening the arc slightly increases the heat at the piece. It is not generally advised to hammer the weld made with a metal electrode, since the metal introduced is less porous. The pencil must be moved along as the material is added, inasmuch as metal is being constantly melted into the weld. To secure the right heat and right amount of metal simultaneously requires some little practice. It is not necessary to heat the object piece except at the immediate point of welding. Preheating is often resorted to, however, to prevent shrinkage cracking. Although considerable skill must be acquired in order to perform arc-welding work successfully, the fact must not be overlooked that smith welding also is highly skilled work. Arc welding is the easier of the two to master.

The strength of welds made through the use of the electric arc compares very favorably with the strength of the piece welded. To be sure, the metal which goes into the weld is really in cast form but it is often worked by hammering while still hot. The strength of the weld may be safely considered as equal to the strength of the material of the filler bar in cast form. If rolled steel is to be welded and the strength of the weld is dubious, it may be possible to build up or leave extra metal at the weld, to make up in quantity of metal what may be lacking in quality.

The Bernardos process was originally the most extensively used of the electric arc-welding methods, but the Slavianoff process is now coming into greatest favor. The Bernardos method is best suited for heavy work where speed is desirable and finish is unimportant. The Slavianoff process gives a better weld, leaves the metal less porous, can be more neatly executed, requires less power and, after skill is acquired, lends itself to better control and surer results. The Bernardos method is used almost exclusively where a piece is to be melted or cut off, while the Slavianoff method is essentially a welding, filling-in or building-up method.

The field for arc welding is extensive. In the past it has found wider application in repair work than upon new work. In marine work, for repairing propellers, stern frames and many internal breaks this service is invaluable. In the railroad shop arc welding is becoming extensively used for welding up cracks and breaks in locomotive frames and cars, where the work can be done without dismantling. Worn parts are frequently "built up" by the addition of new metal. Welding the ends of flues is becoming recognized as much superior to beading or expanding. Cracks in boilers, leaks at staybolts and the like are readily remedied by electric arc welding. In the foundry, arc welding is excellent for reclaiming defective castings, adding broken-off parts or filling blow holes. The Bernardos process is also used in foundries for melting off heavy risers and sink heads. In machine shops and manufacturing plants arc welding is becoming popular both for repair work and for new processes. Shafting may be welded together, keyways filled in, new metal added to gears from which teeth have been broken. The number of applications and opportunities for use is surprising when once realized.

Arc welding is also being adopted to some extent for civil-engineering work, being used to replace riveting. In a notable instance, that of the Catskill Aqueduct, N. Y., arc welding was used for connecting the sections of the steel bore, proving extremely successful.

(To be continued.)

Summer Outing of Cedarmen.

Friday, June 25, saw the departure from Minneapolis, Minn., of members of the Northern White Cedar Association on their annual midsummer outing, traveling north *via* the Northern Pacific Railroad in a private sleeper to Beaudette, Minn., some 450 miles north of Minneapolis. At Duluth and way points, additions to the party were made until the party grew to 58 men affiliated in some way or other with the northern white-cedar industry.

From Beaudette the party was conveyed by a fleet of six launches to a camp on Savaskong Bay, Lake of the Woods, approximately 60 miles north, a place of truly wondrous natural grandeur. Here for four days ensued enjoyment charactertisic of Cedarmen meetings. Under the chaperonage of Guides Riley, Koots, Trip and McGarry, long trips to points of interest throughout the lake were taken, including Nestor Falls, the Fisheries, Crow Portage, the home of numerous Indians, Lake Obabokin and others where fish and frolic aided in passing a most pleasant time and one not easily forgotten.

Here was found nature undisturbed in all her glory with deer, moose and other wild game in abundance. Fishing was unexcelled through every part of the hundreds of miles of lake dotted at close intervals with islands, which seem to rise like flowerbeds out of the vast sheets of blue. The stay was made immeasurably pleasant by the excellent fare of Chef Jack Everett, assisted by a corps of competent aids.

As usual contests were conducted, with honors at pea shooting taken by Secretary Boucher from Guide Riley, whose reputation in that most difficult accomplishment extends far and wide among the whites and Indians of the vicinity. Napoleon LaPointe administered defeat to Derricks of Rainy River, in a nut-swallowing game.

On Monday evening, the last in camp, a round-up was held, with T. M. Partridge officiating as ringmaster. All within reach were requested to show cause for their presence and contribute to the joy making. No executions were necessary because of business affairs being merged with the frolic.

Camp was broken on Teusday morning and a landing made at Beaudette after a pleasant journey through the lake. The evening was spent inspecting adjoining cedar yards. The majority of the party regretfully left on Tuesday evening after a sojourn thoroughly enjoyed by all.

Electrical Prosperity Week.

At the meeting of the Electrical Prosperity Week Advisory Committee, held at the offices of the Society for Electrical Development, New York City, July 1, the following questions were taken up, discussed and decided.

Poster Stamps.—It was realized that these would be a very effective means of bringing Electrical Prosperity Week to the attention of the public and it was decided to get up a poster stamp of the design of the Week, printed in four colors, for free distribution. The quantity to be ordered was discussed and it was the unanimous opinion that one or even two million would be insufficient for the purpose and it was left to the members of the staff who were on the Committee to decide, the consensus of opinion seeming to be that five million stamps should be ordered.

Bill Posters.—As 24-sheet posters would cost at least 90 cents each and as comparatively few of them would be used because of the cost of posting, it was decided to use 8-sheet posters only. If a member wishes to use a 24-sheet space he can do so by using two 8's, filling in the space between with the name of his own company. These 8-sheet posters to be furnished free to members only. Initial order to be 5,000.

Street-Car and Window Cards.—Quotations on cards lithographed in six and eight colors indicate that the cost would be too high and the members of the staff are now securing quotations on street-car and window cards lithographed in four or six colors, also printed in four or six colors, the ordering of these cards being left to the members of the staff. It was decided that the street-car cards and window cards should be the same size; in the case of the street-car cards the design and wording to be printed horizontally, the window cards to be used upright with the design at the top and the wording below. Window cards to be furnished free to all. Street-car cards to members only.

Window Lithograph.—This to be printed and furnished free to all, and to be 24 by 32 inches, carrying the design of the Week; to be lithographed in six colors; the initial order to be 5,000, with the privilege of increasing to 10,000 if necessary.

Muslin Signs.—A number of these (depending upon the cost) to be produced for use on delivery wagons, etc., and to be distributed free to members only. Quotations to be obtained and order placed by the staff.

Folders for the Public.—It was decided to produce a six-page folder 3.1 by 6.2 inches with contents as follows: Cover to contain the Week design with suitable wording under it. Back page blank (all but a few lines at top) for imprinting dealer's name and special proposition he may offer for the Week; this space to be surrounded by a border to indicate more clearly that something is to be printed in it. The last outside page to contain a simple chart showing lowering cost of electricity as compared with rising cost of other commodities. On the three inside pages a nice two-color line illustration of a very attractive, modest home; also thumb-nail sketches of the various members of the family; the word appeal to urge the readers to "Do It Electrically" and the Week of course, to be brought in. Folder to be printed in two colors, on coated stock, which allows a cost of less than $1.75 per 1,000 on the initial order of 2,000,000 decided upon. To be free to members only. To be sold at cost to non-members wishing to distribute them. Manufacturer and jobber members not to get them in quantity except a number of them for distribution in their own mail, imprinted to the effect that more may be obtained from the S. E. D. This to prevent non-member dealers getting folders free from manufacturers or jobbers and thereby preventing their joining the Society.

Imprinting.—As the Society is not in a position to imprint cheaply small quantities of folders, etc., it was decided that no imprinting should be done except of street-car cards.

Picture Puzzles.—The manufacturers (Pamos) quoted a price of about three cents each on 10,000 of each of seven designs (70,000). As we have not sufficient funds to purchase and distribute these free but would be obliged to sell them imprinted at about five cents each, and it had been determined not to *sell* anything connected with Electrical Prosperity Week to members, it was decided not to order any. The manufacturers have the designs prepared and the Society is to give them reasonable assistance in selling the puzzles.

Program of Ohio Convention.

The twenty-first annual convention of the Ohio Electric Light Association will be held at the Breakers Hotel, Cedar Point, O., July 20 to 23 inclusive.

The first session will be held on the afternoon of Tuesday, July 20. Col. C. V. Hard will deliver the presidential address, and reports will be made by the Executive Committee, the Secretary, the Illuminating Committee, and the Insurance Committee.

At the session on Wednesday morning, E. J. Bechtol, of the Hodenpyl, Hardy Company, New York City, will present a paper entitled "Every-day Problems Confronting the Central-Station Manager." The report of the Transmission and Distribution Committee will be presented by M. H. Wagner, and the election of officers will take place. In the afternoon a lecture will be given by R. H. Grant, sales manager of the National Cash Register Company.

At the session on Thursday morning, E. B. Fenton, of Sandusky, O., will present a paper "Snuggling up to John Smith." The report of the Meter Committee will be presented by A. H. Bryant and there will be a discussion of proposed meter rules. In the afternoon B. W. Waltermire, chairman of the Ohio Public Utilities Commission, will make an address.

At the session on Friday morning, Thomas F. Kelly will present the report of the Committee on New Business Co-operations, and C. W. Chappelle will present the report of the Committee on Electric Vehicles. A talk on Industrial Electric Heating will be made by H. O. Loebell, of Henry L. Doherty & Company.

The usual entertainment features have been arranged for the convention. The Association banquet will be held on Wednesday evening and balls will be held in the dancing pavilion on Tuesday and Thursday evenings. On Thursday afternoon there will be a bathing party with contests of various kinds. Musicales, card parties, a bowling party, and a launch ride have been provided for the ladies during the time occupied by the sessions of the convention.

The secretary of the Ohio Electric Light Association is D. L. Gaskill, Greenville, O.

Electric Club-Jovian League Picnic Arrangements.

The outing to be held by the Electric Club-Jovian League of Chicago at Ravinia Park, Ill., on August 5, promises to be the most elaborate and enjoyable event ever held by electrical men in Chicago. Two special trains will be run over the Chicago & North Western Railroad to the grounds, one leaving about 10 a. m. and one shortly after noon. Athletic events will start immediately upon the arrival of the early train.

Special attention is being given this year to aquatic events, and a very interesting program is being arranged. For the convenience of the picnickers "jitney" bus service will be established between the picnic grounds and the beach.

The usual concert by the Chicago Symphony Orchestra will be held in the afternoon and a grand opera performance will be given at night. Dancing will be held in the new open-air ballroom.

H. A. Mott is chairman of the general picnic committee and F. M. Rosseland, secretary. William Taussig is in charge of aquatic events; R. I. Phillips and O. B. Duncan in charge of sports on terra firma; and Morgan P. Ellis will be in charge of the rejuvenation which will be held in the open air between 5 and 8 o'clock p. m.

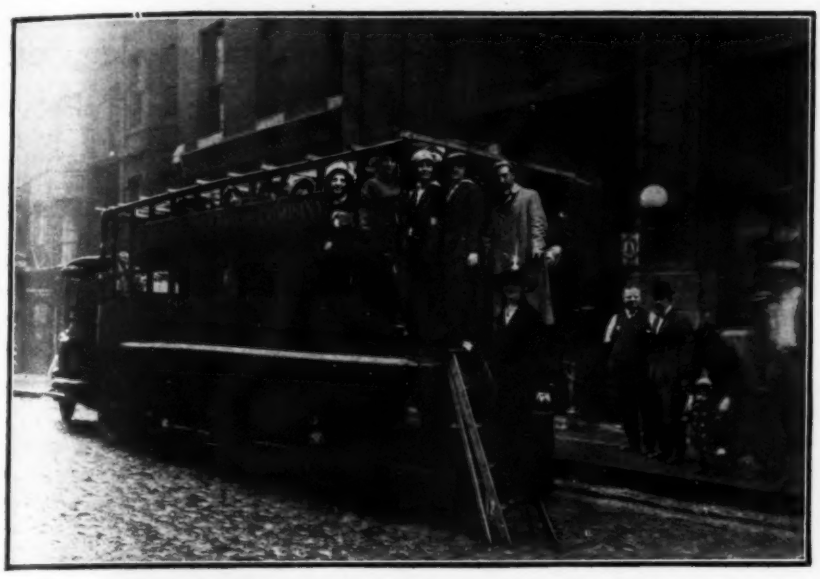
C. W. Forbrich, 608 S. Dearborn Street, is in charge of ticket disbursements. Tickets, including train fare, are $1.00.

Service at Any Cost.

The extent to which a public utility will go to maintain service, regardless of the expense or work involved, was strikingly illustrated by the Chicago Telephone Company during the recent strike of street and elevated railway employees in Chicago. Service had to be maintained because of the dependence of the public on the telephone for the transaction of its business and it is interesting to note that in this connection the traffic during the two days of the strike increased fully 50 per cent.

The greatest problem of the Chicago Telephone Company was the transporting of its 6,000 operators from their homes to the down-town exchanges. Every available conveyance was pressed into service and in addition several hundred of the day operators were quartered in the down-town hotels.

The employees entered into the spirit of the occasion and co-operated with the company to their fullest extent, frequently enduring hardships without complaint. One of the accompanying illustrations shows a group of operators at dinner in the Hotel La Salle and a truck load of employees en route to their homes after a day's work is shown in another view.



Truck Carrying Telephone Employees During Car Strike.

Production of Electrical Porcelain.

The annual report of the United States Geological Survey for 1914 shows that there was produced in this country during that year a total output of porcelain insulators and other porcelain electrical supplies valued at $4,130,270, compared with $5,737,741 in 1913. There were reported 37 firms engaged in this manufacture. The largest production was in Ohio, with a total of $1,472,359; then followed New York with $940,029, and New Jersey with $905,878. Electrical porcelain constituted 11.67 per cent of the total output of pottery products.

In 1914 the mines of Indiana yielded 16,641,132 tons of coal having a value of $18,290,928.

Group of Telephone Operators Quartered at Hotel La Salle During Car Men's Strike.

New Electrical and Mechanical Appliances

Porcelain Keyless Socket for Use in Husks.

A new type of porcelain socket particularly designed for use in husks on ornate fixtures has been placed on the market by Harvey Hubbell, Incorporated, Bridgeport, Conn. The accompanying illustration shows this new socket as it fits into a husk, thus demonstrating its special suitability for this purpose. This keyless socket is built along the lines of an electrolier socket, providing a compact and practical porcelain socket for fixtures where socket coverings are deemed to be desirable.

Metal caps for these sockets are obtainable with either one-eighth, one-quarter or three-eighths-inch bushings.

New Socket for Husk Work.

To facilitate attaching the cap to the husk a special wrench is furnished upon application with standard package quantities. On account of the special design of the socket interior, all wiring connections are easily and quickly made.

New Device to Eliminate Accidents Due to Phase Failure and Reversal.

When a motor-driven machine starts off in a direction opposite to that which the operator is expecting, serious accidents are liable to happen. An elevator may be dashed to the pit or through the top of the shaft, and costly machines, pumps, cranes, hoists, etc., may be seriously damaged if the direction of rotation is unexpectedly reversed when the starting device is closed. With alternating-current polyphase motors this may happen, due to reversing of the phases, and engineers have turned their attention to the problem of eliminating this source of accident. Failure of one phase may also cause burning out of the motor.

A new compact type of phase-failure relay, shown in the accompanying illustration, has been developed in the engineering department of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis. This device is similar to a vertical motor having a two or three-phase stator winding and a squirrel-cage rotor winding. The rotor shaft extends at the top, and to this extension a casting is secured, carrying contacts designed to close a pilot circuit which controls the motor starter. This phase-failure relay provides against abnormal drop in voltage, against failure of one of the phases, and against reversal of the phases.

If the supply voltage falls below about 70 per cent of the normal, the relay opens the control circuit of the motor controller and keeps it open until the line voltage returns to at least 85 per cent of normal. These limits can be adjusted before shipment to suit special conditions.

In case of phase failure, caused by the opening of one of the supply lines at any point, the relay opens the control circuit if the motor is under appreciable load, and keeps it open until the fault is corrected. If the load on the

Phase-Failure Relay.

motor is very light, so that no harm would result from its running single phase on account of the phase failure, the device may not operate until the load is increased or the motor shut down. If the motor is at rest at the time of phase failure the relay will act immediately. Thus the motor is allowed to run as long as no damage can result.

In case of phase reversal the relay opens the control circuit immediately and keeps it open until the phases are reconnected in the proper order. Accidents due to the motor running in the wrong direction when started up are, therefore, avoided.

New Interchangeable Attachment Plug.

A new type of separable, interchangeable, composition attachment plug of simple but sturdy design has

Interchangeable Attachment Plug.

been placed on the market by the Chelten Electric Company, 314 Armat Street, Philadelphia, Pa. The accompanying illustration of the body of the plug shows its compact and neat form. The edges of the plug are knurled, so that it may be readily screwed into lamp sockets or screw-type receptacles. The terminals are made of strong spring brass, giving excellent contact, and the electrical rating is 660 watts, 250 volts; the plug is really capable of carrying considerable overload if necessary.

The caps for these plugs are interchangeable with similar caps now on the market, thus furthering the movement for more general interchangeability of plugs and receptacles. Caps are made both in composition and with brass cover.

Unique Generator Set for Country-House Lighting.

The duplex generator set for rural lighting plants described and illustrated on page 82 of our July 10 issue has attracted much attention among our readers. This machine is manufactured by Roth Brothers & Company, Adams and

Loomis Streets, Chicago, Ill. Through an oversight the name of the makers was omitted in the article referred to.

New Socket Base.

A new socket base is being offered by the H. T. Paiste Company, which fits all the shells for its "Multipo" or "New Wrinkle" types of sockets. This base is designed to fit on the 10-ampere openings of round-base pipe taplets, both those with a single opening and the gang types with two, three or four openings.

Pipe-Taplet Socket Base.

To install these socket bases, it is necessary merely to remove the switch bar and ring which are used for fastening switches and other surface fittings. The base entirely covers the opening of the pipe taplets, making a neat-looking fitting. No tap wires are required to fasten these socket bases to the main wires. The latter are bared for half an inch and slipped under the heads of the binding-screws.

Socket Shells That Fit New Base.

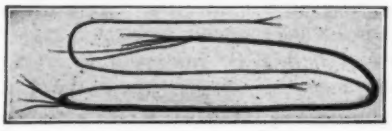
The key, keyless and pull-socket shells can be used on the same base. Paiste socket shells are now furnished with threaded bead, so that the "Uno" (one-piece) shade-holders can be screwed on them. This is much the quickest and easiest method of shade-holder fastening and secures a very rigid support. Uno shade-holders can be ordered at the same time, thus helping to bring the order up to the weight necessary to secure free delivery.

Uno Threaded Shade-Holder.

The Hart & Hegeman Manufacturing Company, Hartford, Conn., is sole selling agent for this as well as all other Paiste products.

Cable Assemblies for Motor Cars.

The Standard Underground Cable Company, Pittsburgh, Pa., is now furnishing its automobile cables in assembled or "harness" form, as shown in the illustration, complete with terminals and ready for installation. This method of selling cable was adopted by the company as a convenience for the buyer and it is said to possess also the advantage of economy, and to make for neatness, since a good assembly makes the best-looking installation on the finished car. The assemblies are made up to suit the dimensions of the cars on which they are to be installed and, since the necessary terminals are already attached, there is nothing to be done in installing the cable but to make the connections.



Assembled Motor-Car Cables.

New Caps for Attachment Plugs and Receptacles.

To the already large assortment of attachment plugs made by the firm of Harvey Hubbell, Incorporated, Bridgeport, Conn., there have recently been added two caps in which the distinctive feature is a unique type of cord-strain relief which eliminates the need for knotting the cord and therefore produces a quicker assembly and a more durable combination. Fig. 1 shows an exploded view of the new cap that has standard contacts. At the top of the cap is a threaded ring which swivels around a split bushing that grips the cord when the ring is screwed into the depression in the upper end of the cap. The cord is first passed through the outer ring and its ends connected to the binding screws inside the cap. It is then drawn taut, the split bushing applied and the ring screwed about the bushing into the cap. This firmly clamps the cord so that the strain of pull on the cord does not come on the binding screws and the likelihood of a wire thereby breaking connection is eliminated.

Fig. 1.

Fig. 2.

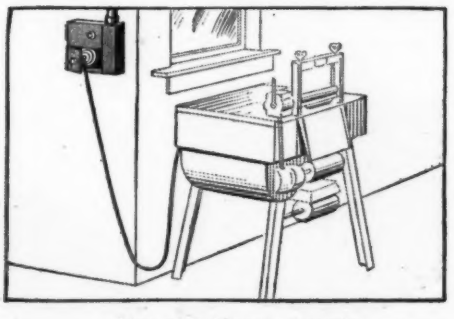
These new caps may each be provided with a special strain-relief bushing adaptable to armored cable. These caps are interchangeable with the entire line of Hubbell wall and flush receptacles equipped with T slots, also with the respectively corresponding separable attachment plugs. The cap shown in Fig. 2 has the small-type contacts. This view shows the compactness of the completed cap with the bushing and threaded ring in place.

Special Fittings to Facilitate Liberal Use of Electricity in Apartment-House Laundries.

Despite the active campaigns for popularizing the electric washing machine and iron, these convenient labor-saving appliances have not been very extensively used by the residents of apartment houses because the laundries in such buildings have seldom been equipped so as to permit the different tenants to use electricity under proper conditions. Each tenant should have available a branch circuit from his meter for this special purpose, the outlet on this circuit being kept locked while not in use to prevent theft of current by other parties.

Special Laundry Fitting.

Three-Gang Laundry Fitting.



Use of Fitting in Laundry.

To meet this requirement there has been placed on the market a line of special fittings by the Appleton Electric Company, 212 North Jefferson Street, Chicago, Ill. As shown in the

accompanying illustration, these fittings are made in single, two and three-gang style. These fittings are provided with one, two or three locked hinged doors, so that each tenant holds a key to his particular outlet. Where there are more than three tenants in the building, as many gang boxes as necessary are installed. The manner of installing a two-gang box and connecting it to a washer is shown in the line cut herewith.

Each of these fittings is made of drawn steel finished either in sherardized or black-enamel finish. The gang fittings are furnished with partitions forming separate compartments. The back of each compartment is drilled and tapped for the supporting screws of a receptacle for receiving the attachment plugs of the washer and iron. The fittings are easily installed and have a neat appearance. They should find a ready market because of the great need of a device of this kind that really promotes liberal use of electricity in laundry work.

New Ralco Plugs and Receptacles.

The great convenience of using small portable electric tools and appliances is steadily leading to the growing use of larger portable devices with which equal, if not greater, advantages can be obtained. Thus in industrial plants of all kinds the value of bringing the tool to the work in many cases is being appreciated and results in the use of even fairly large portable electric tools mounted on wheels or trucks. All this has called for a line of dependable plugs and receptacles capable of conveniently supplying currents of, say, 15 to 50 amperes. This growing demand has been met by the line of Ralco plugs and receptacles marketed by the Central Electric Company, 326 South Fifth Avenue, Chicago, Ill. Several of the Ralco devices have been described and illustrated in these columns in previous issues. To keep abreast of new requirements, however, several new plugs and receptacles have recently been added to the Ralco line and others improved.

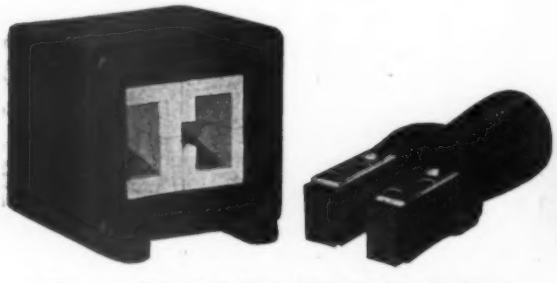


Fig. 1.—Ralco Two-Phase Receptacle and Plug.

Fig. 1 shows a two-phase receptacle with non-reversible plug. The box is of heavy cast iron with two lugs at the top and two at the bottom for mounting. The receptacle within has substantial porcelain blocks with phosphor-bronze contacts of liberal size. The plugs are built for heavy service and provided with easily wired contact plates. For two-phase service a non-reversible plug is used, as shown. A reversible plug is also made for this outfit for use on single-phase lines, although the one shown can, of course, be used in this case also.

A three-wire receptacle with non-reversible plug is shown in Fig. 2. This is much like the three-phase outfit, but is especially designed for use on three-wire direct-current circuits where the plug must be non-reversible. These sets are made for indoor and for outdoor use.

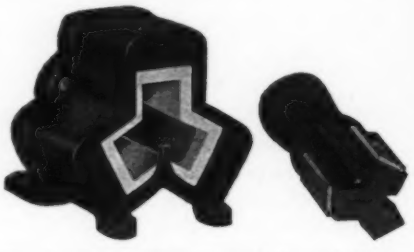


Fig. 2.—Three-Wire Receptacle and Plug.

The latter, or weatherproof type, is made fused or fuseless and is rated as high as 60 amperes, 220 volts or 30 amperes, 440 volts.

A swiveling receptacle with plug is shown in Fig. 3. This set consists of a special cast-iron swivel support below which is a standard two-wire Ralco receptacle. The conduit is brought in at the top. This device makes it possible to turn the plug and cord through nearly 180 degrees and avoids bending the cord near the plug. A single-pole outfit for 600-volt railway systems is also made of this type that finds favor in car barns and car shops.

A special flush receptacle, plug and box are shown in Fig. 4. This set is especially suited for use where the conduit is laid in concrete walls as a permanent wireway for portable lamps, tools, stereopticons and portable battery-charging outlets where space is valuable. This outfit is waterproof, which makes it peculiarly suitable for railway motor and locomotive pits, basements, etc. The mounting bases for the receptacle proper are set back in the box so as to be one inch from the face of the concrete to eliminate the liability of accidental breakage. The floor of the box slopes downward slightly, so that when set with its face flush with the wall there is a downward drainage toward the entrance. A spring door covers the receptacle opening. The cast-iron box has knockouts for three-fourths-inch conduit on all sides and rear.

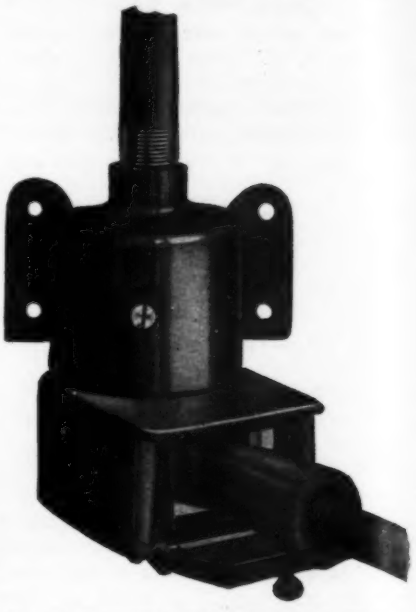


Fig. 3.—Swiveling Receptacle with Plug.

All these sets are built for severe service such as equipment of this type is likely to receive at the hands of brawny shop men.

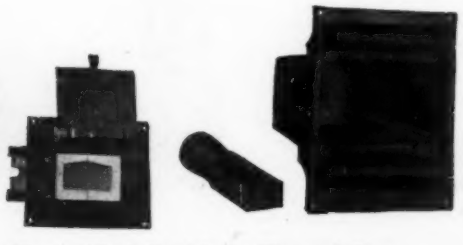


Fig. 4.—Flush Receptacle, Plug and Box.

Exhibit of Rectifying Apparatus for Motion-Picture Work.

One feature of the exhibit made by the Westinghouse Electric & Manufacturing Company at the Panama-Pacific International Exposition that attracted attention at the motion-picture convention held in San Francisco beginning July 12 was the display of motor-generators and rectifiers for supplying direct current to the projecting lamps used in the several motion-picture theaters about the exposition grounds.

A 4.5-kilowatt set supplies the picture machine used in the Pennsylvania Railroad Company's new steel exhibit car; this is in operation eight hours a day. A mercury-arc rectifier set is used to supply direct-current to the picture theater of the American Telephone & Telegraph Company. Four motor-generator sets are used in con-

nection with Simplex projection machines in the four picture theaters forming part of the exhibits of the United States Bureau of Education, the Precision Machine Company, the United States Steel Corporation, and the United Shoe Machinery Company. Another set is used with a Power projection machine in the exhibit of the Nicholas Power Company.

The various rectifying sets together with their simple control equipment are demonstrating the ease with which the direct current needed for satisfactory picture projection may be obtained from alternating-current supply systems.

New Adjustable Portable Lamp.

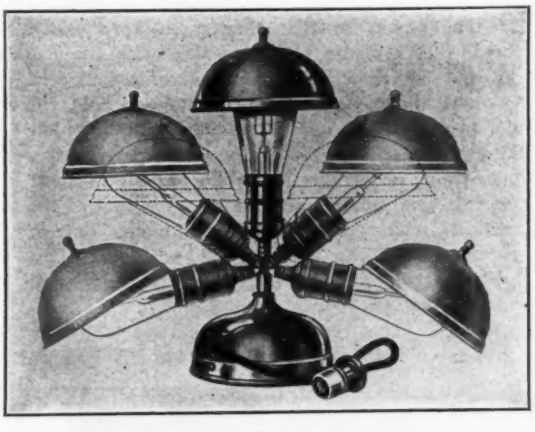
A new type of convenient portable lamp with cord-slack reel and general adjustability as prominent features has been placed on the market by the Rose-Strauss Company, 209 West Forty-Eighth Street, New York City. The lamp is provided with ten feet of connecting cord which can be readily coiled up to any extent on the automatic cord reel in the base by pressing a button. By having exposed only just enough cord to meet the need in any case, the difficulties from slack cord are avoided.

A strong steel clamp, rubber-covered, is inserted into the bottom of the base to enable the lamp to be hung or clamped to any hook, upright or other object. The lower surface of the base is protected so that it will not scratch or mar highly polished surfaces when used either as a stand or clamped lamp.

The main patented feature provides for swinging the lamp in any direction and on its pivot at will, but it is impossible to twist the cord, no matter in which position the lamp is turned. The base and section from the swing joint up also always remains stationary, while pulling out the length of cord desired for connecting onto the lamp socket. The lamp shade has a patented clamp attachment, which fits snug on any size bulb and is made in the form of a four-point spring that prevents the shade after being put into one position from dropping into another position.

This outfit is provided with an attachment plug that requires only a quarter turn to insert it in the socket or receptacle, thus avoiding twisting of the cord. A Cutler-Hammer push-button socket is supplied. In upright position, the outfit stands 11.5 inches high. For shipment or traveling, it can be folded up into a compact box five inches square.

Adjustable Portable Lamp.



View Showing Adjustability.

New Delta Electric Lantern.

A new electric lantern which operates on two ordinary dry cells is being announced by its manufacturer, the Delta Electric Company, Marion, Ind. It is claimed by the makers that the new lantern will actually surpass the oil lantern in service and durability. This claim is made on the basis that the lantern is designed to throw a light through half a sphere and that its rugged construction will permit of its being used in every place an oil lantern is used.

The case is constructed of heavy cold-rolled sheet steel, formed and ribbed in a manner to give great strength with a minimum weight. The base is flanged in the same way as oil lanterns, so that when the lantern is set down on hay or rough ground it will not upset. The lantern has a heavy drop-bail handle keyed to the battery case so it cannot possibly come out when in use. This bail handle is large enough to receive the arm of a big man in a big overcoat. In addition to the bail handle, there is a grip handle conveniently placed in the back. It can be folded back flush with the back of the lamp when not in use. There are thus no projections in the back of the lamp, so it can be hung on a nail without tilting to one side or another. The entire case is given a fine gloss-enamel finish, thoroughly baked. The trimmings are nickel-plated and highly finished.

A drawn-brass reflector is used, which is ribbed in such a manner as to give a broad spreading light. It is heavily silver-plated and polished to a mirror finish, making the reflector very efficient as well as attractive in appearance. A convex-concave lens made out of fine lens glass is supplied.

The switch is located in a protected place on the back of the lamp. It has German-silver contact points which are always under firm spring tension, assuring a good connection. A high-grade three-volt lamp with a drawn tungsten-wire filament is used. As all Delta bulbs are made, this one is sealed off with pure platinum wire, eliminating possibility of leakage. The seal is made through a glass stem and not through the thin wall of the bulb.

A recent visitor to the Delta factory reports there was a very large amount of equipment for making these lamps. Elaborate dies and tools are used which eliminate expensive process of manufacture, and as the Delta company makes every part of its lamps, it is enabled to make an unusually high-grade product at reasonable prices. The Delta Electric Company announces that this is only one of five new lanterns and lamps it is placing on the market.

Delta Electric Lantern.

New Westinghouse Electrical Equipment for Gasoline Automobiles.

In preparation for 1916, the Westinghouse Electric & Manufacturing Company has added to its line of electric starting lighting and ignition equipment for automobiles, a round type of starting motor and lighting generator. Both

reduction in weight and increased compactness have been obtained in this new design.

Several methods of pinion shift are available in these new machines. The illustrations show the round type motors with automatic screw shift which can be arranged either for inboard or outboard mounting to suit the space requirements of the car.

When this form of shift is used full battery voltage is impressed on the motor when the starting switch is closed, and the motor starts immediately. The pinion, when the motor is at rest, is entirely away from the flywheel gear. The threaded shaft is connected to the reduction-gear shaft by a spring which thus forms a flexible coupling. As the load is not large enough to compress the spring when the motor starts, the threaded shaft is immediately revolved by the spring in released position. The pinion moves on its shaft by virtue of the revolving threads, until it reaches the flywheel. If the teeth of the pinion and flywheel meet instead of meshing, the spring allows the pinion to revolve until it meshes with the flywheel. When the pinion is fully meshed into the flywheel teeth, the spring compresses, and the pinion is then revolved by the motor as though a continuous shaft, turning the engine over. When the engine fires and the flywheel peripheral speed continuously exceeds that of the driving pinion, it forces the latter out of mesh, and it is returned to its original position in the screw-shaft housing. During the periods immediately after the engine has passed over any one of the points of maximum compression, the spring offers an elastic cushion between the flywheel and the reduction gear, so that the pinion will not be thrown out of mesh.

Another form of shift furnished is operated by an electromagnetic device mounted directly on the motor and operating through a hollow shaft, as shown in one of the illustrations. When the starting switch is closed, the circuit is completed through the switch and the shifting magnet and the motor, which is of the series type. The current flowing through the magnet circuit causes the armature and shaft and the pinion to rotate.

As the motor takes a relatively higher current at starting, the shifting magnet is energized sufficiently to overcome the force of the return spring and draws the shifting rod through the shaft, thus sliding the revolving pinion into mesh with the gears on the flywheel. Diagonal teeth are used on the flywheel and the pinion so that they mesh very easily. When the pinion meshes with the flywheel gear, the current required to turn the engine over is enough to hold the pinion in mesh until the engine fires, but as soon as the engine picks up and tends to drive the motor the current falls off immediately and the return spring of the pinion shift throws the pinion out of mesh to its original position. This method of starting requires a very small switch.

The round-type generators are furnished either with or without ignition auxiliary. They can be operated by chain or by gear drive directly from the engine.

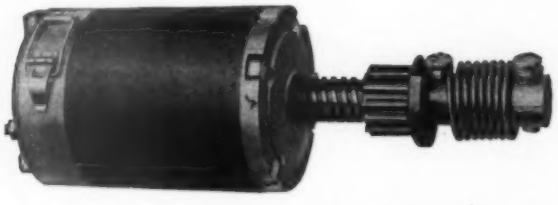
While the engine is not running or is running at very low speed, the lights are supplied entirely by the battery. At a predetermined speed the generator is "cut in" on the battery circuit by a separately mounted regulator and the generator supplies some of the current used by the lights or begins charging the battery if the lights are not turned on. On further increase of speed the voltage rises and it, together with the battery-charging current, is controlled by the automatic voltage regulator.

Two functions are performed by the voltage regulator. The first is to disconnect the generator from the circuit at speeds below that at which battery voltage is generated; the second, to maintain constant voltage at all speeds above the cut-in speed. This regulator is a small and compact device generally mounted on the back of the dash requiring no adjustment.

For ignition, a Westinghouse vertical ignition unit can be mounted directly on the generator, or mounted separately at some other point convenient for connecting mechanically to the engine. This ignition unit contains a low-tension interrupter or timer, ignition coil, condenser and a plate-type distributer. It is very compact and yet has all parts readily accessible. The core is designed particularly for high efficiency and low coil lag.

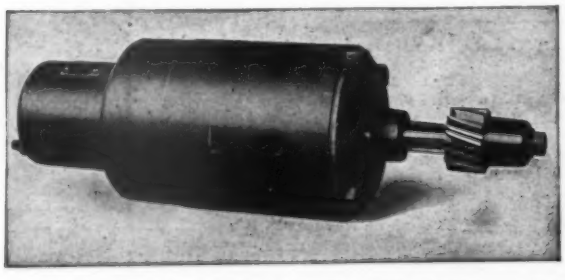
Special insulation and treatment are used in these small outfits as in the larger Westinghouse equipments. All windings become after treatment a solid mass that does not soften under heat, cannot work loose under vibration and is absolutely impervious to water, oil or gasoline. It is this treatment that has eliminated the possibility of open circuits in this line of automobile apparatus.

Everything has been done to make these outfits as light as possible. Not only has the size been reduced practically to a minimum, but everywhere possible the lighter metals have been used in the construction. End frames of the motors and generators are made of magnalium, a very strong aluminum alloy. Magnetic circuits have been so condensed as to use a minimum weight of material and the metal in all parts has been so distributed as to give ample strength without unnecessary weight.

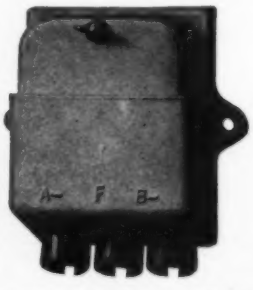


Inboard Starting Motor Complete With Single-Reduction Screw Pinion Shift.

Outboard Starting Motor With Single-Reduction Automatic Screw Pinion Shift.



Starting Motor With Magnetic Pinion Shift.



Automatic Voltage Regulator.

New Magnetite Arc Lamps for Street Lighting at Charleston, W. Va.

One of the first installations of the new type of pendent magnetite or luminous arc lamps was recently made at Charleston, W. Va. The lamps were manufactured by the General Electric Company and are equipped with prismatic glass refractors. The system of

lighting in this city may be divided into three classes: "White Way" or ornamental lighting in the business section, intermediate lighting in the residential section, and suburban lighting.

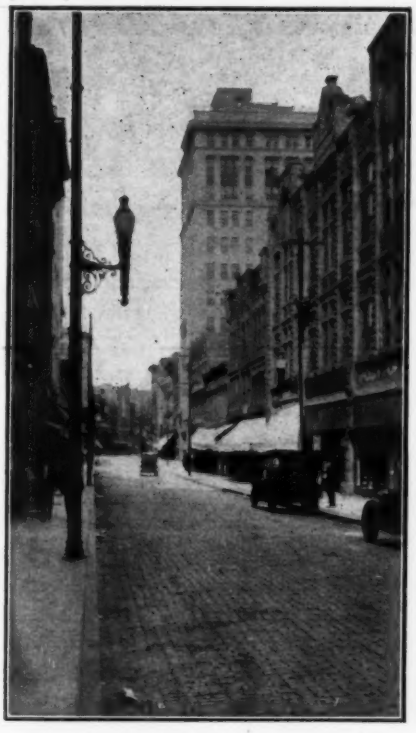
In the business section are installed 62 four-ampere ornamental luminous arc lamps, using high-efficiency electrodes and equipped with fine-texture Alba globes. The lamps are mounted on ornamental brackets manufactured by the Electric Railway Equipment Company. The brackets are supported on steel trolley poles with overhead line construction. The poles are spaced approximately 120 feet apart on each side of the street and are staggered.

New Four-Ampere Luminous Arc Lamp.

The elevation of the lamps is 16.5 feet from the curb to the arc.

With this spacing a wonderfully well diffused and brilliant daylight effect is produced with an almost entire absence of shadows. On account of the peculiar shape of the globe, considerable light is projected upward, which illuminates the front of the buildings from the pavement to the cornice. This soft and well diffused distribution of bright light is particularly effective and practical for business sections.

In the residential sections and throughout the greater part of the city, pendent luminous arc lamps with refractors and operating at four amperes are employed. These are hung from 22 to 25 feet above the street, at street intersections, which spaces the lamps from 300 to 400 feet apart. The refractor type of lamp, on account of its extensive distribution of light, is especially adapted to such spacing, and an exceptionally even illumination is produced on the street surface. Both the center-span and mast-arm suspension are used, in conformity with the physical requirements of different localities.



Ornamental Luminous Arc Lamps on Charleston Business Streets.

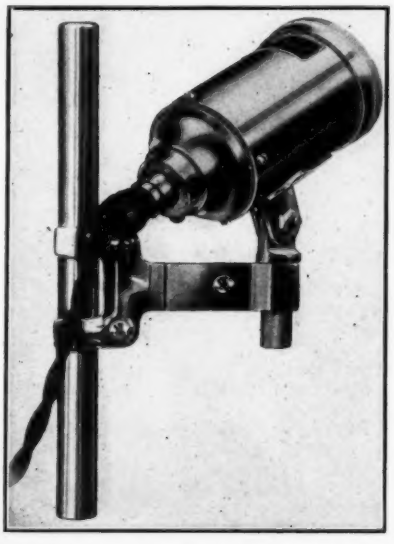
In the remaining outlying portions of the city and in suburban sections, where the use of large units is not warranted, low-wattage series incandescent lamps are employed, mounted on brackets and equipped with radial-wave reflectors. The entire system is operated from General Electric fifty-light, double-tube, series rectifier sets.

Pendent Luminous Arc, Center-Span Suspension, in Charleston Residence Street.

Dirigible Searchlight for Automobiles.

An improved searchlight for automobiles, known as the Pittsburgh Dirigible Searchlight, is illustrated herewith. This is a small compact lamp for wind-shield mounting, equipped with two high-power lenses and a Mazda bulb. It operates at six volts and gets its supply of current from the lighting system or can be used with a dry-cell battery, if desired.

It is cylindrical in shape, 6 inches in length by 2.25 inches in diameter, and is attached to the wind shield by means of a universal joint, which permits it to be turned in any direction desired.



Dirigible Automobile Searchlight.

The beam of light which it throws enables the driver to read sign-boards and house numbers without moving from his seat. It also affords him a light for backing the car, for illuminating short turns and for picking out objects that are out of the range of the ordinary headlight. This lamp on the wind shield saves the tourist a great deal of inconvenience and annoyance when traveling over strange roads. It is also a very valuable accessory for doctors' cars and delivery trucks.

The outfit is easily removable from the wind shield and when detached becomes a convenient lamp to use as a trouble-finder and in the garage It is manufactured by the Pittsburgh Electric Specialties Company, Pittsburgh, Pa.

Latest Approved Fittings

FUSED ATTACHMENT PLUGS.—The Bryant Electric Company, Bridgeport, Conn.

Separable attachment plugs for use with glass-tube-inclosed fuses.

Bryant or Perkins, 2 amperes, 250 volts, catalog No. 3386.

Listed June 2, 1915.

GROUND CLAMPS.—Atlas Electric Company, 307 South Fifth Street, Philadelphia, Pa.

Ground clamp for use with No. 10 B. & S. gauge ground wire. A single-piece clamp of tinned copper, provided with suitably spaced holes and with galvanized bolt, nut and washer for clamping to rigid conduit. Adjustable for use with conduit up to and including one inch in size. One end of clamp is channeled to form equivalent of lug for soldering to ground wire.

Listed June 8, 1915.

RECEPTACLES, For Attachment Plugs.—The Bryant Electric Company, Bridgeport, Conn.

Bryant or Perkins. Flush type.

Disappearing door type, 25 amperes, 250 volts, catalog Nos. 446, 447, 448.

Listed May 29, 1915.

RECEPTACLES, Standard. — The Bryant Electric Company, Bridgeport, Conn.

Bryant or Perkins. Keyless, porcelain shell.

Sign, 660 watts, 250 volts, catalog No. 4099.

Bryant or Perkins metal-shell, closed or slotted boxes.

Pull, 250 watts, 250 volts. For use with metal molding, catalog No. Mldg. 486, Mldg. 487, Mldg. 587.

Listed June 10, 1915.

RECEPTACLES, Standard. — The Bryant Electric Company, Bridgeport, Conn.

Bryant or Perkins metal-shell, closed or slotted bases.

Conduit box, catalog Nos. 4102, 4103.

Conduit box, 1,500 watts, 600 volts, catalog Nos. 4095, 4097.

Listed June 15, 1915.

RECEPTACLES, Standard. — The Tregoning Electric Manufacturing Company, 418 Prospect Street, Northwest, Cleveland, O.

660 watts, 250 volts.

Sign, catalog No. 311.

Listed May 22, 1915.

RHEOSTATS. — General Electrtic Company, Schenectady, N. Y.

Motor starters, types CR-1001 and (panels) CR-2201-2206 inclusive.

Speed controllers, types (panels) CR-1300, 1310, 1311, 1321, 1324, 1325.

Resistance units, types CR-9142-9145 inclusive.

CR-1001 starter is standard only when circuit-breaker or fuse is installed in connection with it.

Listed May 27, 1915.

The electrical fittings illustrated and described in this department have been approved by the Underwriters' Laboratories, Incorporated, following examination and tests conducted under standards of the National Electrical Code as recommended by the National Fire Protection Association.

SIGNAL APPLIANCES. — The Bryant Electric Company, Bridgeport, Conn.

Bryant or Perkins.

A special flush switch controls a 125-volt signal-lamp circuit which can be opened by a button and closed by a solenoid, these forming parts of switch. The circuit of solenoid can be closed by a special pendent push-button switch or push-botton flush switch, catalog No. 487, and includes a small single-pole glass-tube fuse in a special casing. The closing of circuit by flush switch is designed to open circuit of solenoid and pendent switch.

An auxiliary audible signal device consisting of a three-inch single-stroke bell designed for connection in series with coil of solenoid switch and including a push-botton switch whereby bell may be shunted if desired.

Listed June 8, 1915.

SOCKETS, Standard.—Connecticut Electric Manufacturing Company, Bridgeport, Conn.

C. E. M. 660 watts, 250 volts.

Key, catalog Nos. 11010, 11050, 11052.

Keyless, catalog No. 11060.

Listed June 1, 1915.

SOCKETS, Standard.—Wirt Company, Armat and Lena Streets, Germantown, Philadelphia, Pa.

Dimalites: Extension sockets, Fig. 23 with pull cords; Fig. 24 with turn shade 40 watts, 125 volts.

Fixture sockets: Fig. 27, with turn shade 40 watts, 125 volts; Fig. 31, with two pull chains, 25 watts, 125 volts.

Listed June 3, 1915.

SWITCHES, Authomatic.—M. & O. Automatic Switch Company, Michigan City, Ind.

Automatic time switch.

This device consists of a cast-iron case inclosing an 8-day, 24-hour clock mechanism, arranged to operate a standard double-pole snap switch, 30 amperes, 250 volts.

Listed June 8, 1915.

SWITCHES, Combination Cutout.—The Johns-Pratt Company, Hartford, Conn.; H. W. Johns-Manville Company, sole agent, New York, N. Y.

Noark service-entrance switches.

Cast-iron boxes, each containing two-pole, porcelain plug-fuse cutout bases mounted on the inside of the box cover and provided with blades making contact with terminal clips, on porcelain bases secured to the bottom of the box, when the cover is closed. 30 amperes, 125 volts, catalog Nos. 3667 and Special No. 6081.

Listed June 1, 1915.

SWITCHES, Surface Snap.—Bryant Electric Company, Bridgeport, Conn.

Bryant or Perkins. (With metal covers.)

Double-pole, 10 amperes, 250 volts, catalog No. 2050-Special.

Listed May 24, 1915.

SWITCHES, Surface Snap. — The Trumbull Electric Manufacturing Company, Plainville, Conn.

Single-pole, 3 amperes, 250 volts, 5 amperes, 125 volts, catalog Nos. 325-328, inclusive.

Double-pole, 10 amperes, 250 volts, catalog Nos. 355-358½ inclusive, 458½.

Three-way, 5 amperes, 250 volts, 10 amperes, 125 volts, catalog Nos. 368, 369.

Four-way, 2 amperes, 250 volts, 5 amperes, 125 volts, catalog Nos. 378, 379.

Two-circuit, 2 amperes, 250 volts, 5 amperes, 125 volts, catalog Nos. 430-433 inclusive.

Three-circuit, 2 amperes, 250 volts, 5 amperes, 125 volts, catalog Nos. 434-437 inclusive.

Also the above types with lock attachment (catalog No. 398) and key (catalog No. 399).

Listed June 7, 1915.

TOGGLE BOLTS.—National Metal Molding Company, Fulton Building, Pittsburgh, Pa.

Cone-head toggle bolts consisting of soft-steel, case-hardened, electrogalvanized toggle nuts having three prongs and screwing on to No. 8 soft-steel electrogalvanized machine screws of 2-inch, 3-inch, and 4-inch lengths, catalog No. 420.

Standard for use only in supporting metal molding.

Listed June 8, 1915.

WIRE CONNECTORS. — Sharfink Electric Manufacturing Corporation, 84 Walker Street, New York, N. Y.

No-Torch connector consists of a brass clamp inclosed in a steel sleeve with set-screws for tightening jaws of clamp upon conductors. For splicing wires without solder.

This device is considered suitable for joining wires of No. 12 B. & S. gauge, or smaller, where such joints are accessible for inspection at all times.

This connector must be insulated as required for soldered joints.

Laboratory tests indicate that this connector will not hold more than three No. 14 B. & S. gauge, more than two No. 12 B. & S. gauge conductors, nor wires of different sizes placed in same end.

Listed May 25, 1915.

Current Electrical News

ATLANTIC STATES.

PLYMOUTH, MASS.—Ornamental street lights, numbering 32 units, and about 2,500 feet of underground conduit, will be installed by the Plymouth Electric Light Company. W.

HAGERSTOWN, MD.—A company is being organized to take over Shepherdstown Electric Light and Power Company and to construct a water works at Shepherdstown. A large electric power house will be built on the Potomac River at mouth of the Antietam Creek.

NORTH CENTRAL STATES.

LIMA, O.—The Western Ohio Railway Company has disposed of its interests in electric plants in nine towns in this section, to the Standard Power and Equipment Company, and a new company, under the same name as the former, is to be organized, with a capital stock of $1,000,000, for the purpose of operating the plants and extending their service. L.

WASHINGTON, O.—The City Council, which is preparing to enter into a new contract with the Washington Light and Power Company, involving the installation of a new ornamental street-lighting system, has retained H. Whitford Jones for the purpose of assisting the city in designing the work. L.

VERNON, IND.—The Vernon Hydro-Electric Company has been incorporated with a capital of $1,000, by George C. Ale, F. T. Semon and others, to manufacture and sell electricity.

BLOOMINGTON, IND.—Residents of South College Avenue are making a junket to Noblesville, Ind., and other cities, where they are looking into the subject of lighting clusters. They announce their intention to install the best cluster-lighting system in Indiana. It is stated that iron standards and five lamps will be used. The junket committee is composed of Dr. C. E. Harris, Dr. Leon Whetsell, Carl Breeden and Fred Beck.

KALAMAZOO, MICH.—A special election will be held shortly to submit two municipal gas and electric bond issues. The latter is to extend the municipal lighting plant to furnish commercial power and light to the entire city. Address Mayor James B. Balch.

JANESVILLE, WIS.—A petition is being circulated for the installation of an ornamental lighting system in the business district.

HALLOCK, MINN.—Bonds to the amount of $15,000 have been voted for the purpose of establishing an electric light system in this village. Work will not be started until fall.

LAKEFIELD, MINN.—Bids will be received until July 28 for improving the water and light system. The specifications include one 125-horsepower fire-tube boiler, four feet by 100 feet concrete chimney, one 75-kilovolt-ampere belted alternator for present engine, one 100-kilovolt-ampere engine-generator unit, switchboard, etc., for the electric lighting plant, and erecting poles, wire, street lamps, transformers, etc., for the electrical distribution system. Address E. C. Anderson, village recorder.

MEIRE, MINN.—Business enterprise in this little village has asserted itself in a demand for an electric lighting system. A system which will cost in the neighborhood of $3,000 is to be built.

ST. PAUL, MINN.—A plan is under consideration to build a central electric light plant to supply light and heat to the city hall, the public library, the police station and other public buildings. Data relative to the cost of such an installation, and the saving that may result to the municipality from it, are being secured by G. O. House, superintendent of the Water Department.

BANCROFT, IOWA.—Bonds to the amount of $10,000 will be issued for an electric light plant. Address City Clerk.

HAZELTON, IOWA.—The proposal for an electric light plant voted and carried. Address Town Clerk.

RICEVILLE, IOWA.—The Riceville Electric Light and Power Company plans to purchase within six months, one 100-horsepower Diesel-type crude-oil engine; also within next 12 months, 12 meters and 24 flat irons. Address L. E. Markham, manager.

SPRINGVILLE, IOWA.—F. M. Hahn, owner of the local light plant, plans to make extensive improvements to plant within six months; also, to purchase transformers, poles, lightning arresters, insulators, meters, etc., also vacuum cleaners and washing machines.

INDEPENDENCE, MO. — Additional machinery will be purchased for electric plant. Address Christian Ott.

ELKTON, S. D.—Decision has been made to install an electric light and power plant adequate to supply the needs of this village.

MARION, KANS.—The City Commission will expend $25,000 improving the light and water system. Address City Engineer.

SOUTH CENTRAL STATES.

LOUISVILLE, KY.—General contract for the construction of the new Y. W. C. A. has been let to the George H. Rommel Company, of Louisville, at approximately $130,000. The electrical contract, yet to be let, will be handled through the architect's office, John Bacon Hutchings.

SOMERSET, KY.—Equipment for a "white way" to extend seven blocks on both sides of the street, is the subject of inquiries for data made by Fred Hunt's machine shop here. Prices and descriptions are wanted on "white way" posts, fittings, fixtures, wire, globes, etc.

MUSKOGEE, OKLA.—A committee of five prominent business men and bankers of the city of Muskogee has been appointed by the Greater Muskogee Association to work out a feasible project for building a dam across the Grand River between Muskogee and Fort Gibson, to generate hydroelectric power. Several plans for financing the project have been submitted by financiers and promoters, and some offers to build the dam under various concessions to be granted by the city of Muskogee have been received. A complete survey has been made, and plans and specifications containing profiles and estimates are in the hands of the committee. The approximate cost of the dam as projected will be $750,000 when complete.

WESTERN STATES.

DILLON, MONT.—The city lighting committee is interviewing property owners with a view to installing a new lighting system, the plans for which call for eight posts to a block, those on the business streets bearing a cluster of three 60-candlepower lamps and the others one lamp.

FLAGSTAFF, ARIZ.—A movement is on foot here for the installatioin of ornamental lamps in the downtown business district.

ARTESIA, CAL.—An election has been called by the Supervisors of Los Angeles County for the formation of a public highway lighting district embracing this city.

LOS ANGELES, CAL.—The Southern California Edison Company has been awarded the contract for improvement work in the Angeles-Mesa Lighting District.

PATTERSON, CAL.—The Board of Supervisors of Stanislaus County has called an election for the establishment of the Patterson Lighting District.

RIVERSIDE, CAL.—The City Council has received a recommendation from the Board of Public Utilities for the installation of a lighting system on North Orange Street.

TEHACHAPI, CAL.—Material for the electric light system has arrived and actual construction work will be started immediately.

BURNS, ORE.—The City Council has passed an ordinance providing for an amendment to the city charter authorizing the city to issue and sell bonds in the sum of $110,000 for the construction of a light plant, waterworks and sewer system.

SALEM, ORE.—Application for permission to use waters of the Wallowa River for the purpose of developing

current for power and domestic purposes, at Joseph, Ore., has been made by the Wallowa Lake Amusement Company. This company operates an amusement resort at Joseph, and the current to be developed will be utilized in lighting the buildings and grounds and in operating power plant, etc. Active construction will be started as soon as permission is granted. O.

BREMERTON, WASH.—The Bremerton-Charleston Light and Fuel Company, of Bremerton, has applied to County Commissioners of Kitsap County, for a permit to establish and maintain electric transmission lines, and accessories, over and along the county roads, highways and streets on Bainbridge Island. R. E. Gordon, county auditor, states the franchise will be granted. O.

REPUBLIC, WASH.—The Ferry County commissioners, here, have been petitioned by George S. Bailey, for the right to construct, operate and maintain transmission lines for electric current over and along public highways in this county. Bailey states if the franchise is granted, construction work will be inaugurated as soon as materials can be placed on the ground. O.

TACOMA, WASH.—The City Council has passed a resolution providing for the installation of a street lighting system, consisting of a cast-iron standard with a single globe.

FOREIGN TRADE OPPORTUNITIES.

[Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch offices at Boston, New York, Atlanta, Chicago, St. Louis, New Orleans, Seattle and San Francisco. Write on separate sheet for each item and give file number.]

NO. 17,428. ELECTRIC BICYCLES AND ACCESSORIES.—The Bureau of Foreign and Domestic Commerce is in receipt of a letter from a manufacturing firm in the United States stating that one of its correspondents desires to be placed in touch with manufacturers of electric bicycles and accessories.

NO. 17,433. POCKET LAMPS.—An American consular officer in Brazil transmits the name and address of a firm of commission merchants which has indicated a desire to receive descriptive literature, etc., relative to small pocket electric flashlights.

NO. 17,453. ARC-LAMP GLOBES.—An American consular officer in England reports that a firm in his district desires to communicate with American manufacturers of heat-resisting inner and outer globes for arc lamps. Prices should be quoted c. i. f. British ports, if possible.

FINANCIAL NOTES.

Dividends.

	Term	Rate	Payable
Brooklyn City R. R.	Q	2%	July 15
New Hampshire Elec. Ry. pf.	—	2%	July 31
New York State Rys. pf.	S	1.25%	July 30

Reports of Earnings.

AMERICAN POWER & LIGHT.
(Consolidated Earnings of Subsidiaries.)

	1915	1914
May gross	$537,918	$526,745
Expenses and taxes	298,022	289,678
Net earnings	239,896	237,067
12 months gross	7,070,030	6,409,425
Expenses and taxes	3,732,700	3,458,277
Net earnings	3,337,330	2,951,148

AMERICAN PUBLIC SERVICE COMPANY.

	Yr. Ended Apr. 30, '15	Yr. Ended Dec. 31, '14
Gross earnings	$502,910	$411,775
Expenses and taxes	330,712	274,870
Net earnings	172,198	136,905
Interest charges	93,006	71,472
Balance	79,192	65.433

MISSISSIPPI RIVER POWER.

	1915	1914
May gross	$ 139,445	$134,063
Net after taxes	110,168	110,519
Surplus after charges	2,881	24,272
Twelve months' gross	1,604,289	.....
Net after taxes	1,261,063	.....
Surplus after charges	98,588	.....

CUMBERLAND COUNTY POWER & LIGHT.

Cumberland County Power & Light Company for the eleven months ended May 31, 1915, reports as follows:

	1915	1914
Gross earnings	$2,318,604	$2,219,745
Net after taxes	1,114,300	1,036,138
Surplus after charges	304,916	249,522

COLUMBUS RAILWAY, POWER & LIGHT.

	1915	1914
May gross	$ 245,947	$ 254,559
Net after taxes	94,777	87,979
Surplus after charges	56,956	44,306
12 months gross	3,065,554	3,052,154
Net after taxes	1,219,210	1,086,602
Surplus after charges	751,235	597,494
Balance after preferred dividends	466,112	312,371

CHATTANOOGA RAILWAY & LIGHT.
(Tennessee Railway, Light & Power Subsidiary.)

	1915	1914
May gross	$ 90,009	$ 94,761
Net after taxes	31,891	35,650
Surplus after charges	1,812	6,810
12 months gross	1,045,731	1,172,194
Net after taxes	340,806	463,035
Deficit after charges	6,625	*147,229

*Surplus.

WISCONSIN PUBLIC SERVICE COMPANY.

Earnings for ten months ended April 30, 1915:

	1915	1914
Gross earnings	$417,335	$363,356
Expenses and taxes	227,388	216,220
Net earnings	189,947	147,137
Bond interest	86,875	79,258
Balance	103,072	67,878

CUMBERLAND COUNTY POWER & LIGHT.

	1915	1914
May gross	$ 294,546	$ 197,885
Net after taxes	86,744	83,750
Surplus after charges	16,418	20,246
12 months gross	2,550,473	2,429,876
Net after taxes	1,109,321	1,031,525
Surplus after charges	339,540	283,838
Balance after preferred dividends	201,540	145,838

PORTLAND RAILWAY, LIGHT & POWER.

	1915	1914
May gross	$ 446,149	$ 538,473
Net after taxes	192,411	251,185
Surplus after charges	3,971	67,542
12 months gross	5,794,271	6,739,779
Net after taxes	2,644,825	3,386,535
Surplus after charges	437,538	1,282,782

PERSONAL MENTION.

MR. C. A. YARRINGTON has been appointed manager of the South Boston Electric Light and Power Company, South Boston, Va., assuming charge on July 15.

MR. CHARLES W. EMBURY has been appointed chairman of the Electric Lighting Committee of the Chicopee Mass., city government. He is a local banker, and not being a politician it is confidently expected his appointment will tend to keep the municipal plant out of politics.

MR. HENRY FLOY, consulting engineer, New York, N. Y., has been retained by the Department of the Interior, Washington, D. C., for the purpose of visiting, inspecting and reporting on the plant and property of the Mt. Whitney Power and Electric Company, situated within the Legnoia National Park.

MR. W. S. GREENAWALT, of Steelton, Pa., assistant superintendent of the Pennsylvania Steel Company's open-hearth furnaces, has been appointed superintendent of the new $2,000,000 electric steel plant of the American Iron and Steel Company, of Reading and Lebanon, Pa., which is about ready to begin operations.

MR. EDWIN M. HERR, president of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., received the honorary degree of Master of Arts from Yale University at the two-hundred and fifteenth commencement, June 23. Mr. Herr became assistant general manager of the Westinghouse Air Brake Company in 1899, later becoming general manager of that company. In 1905 he was appointed first vice-president of the Westinghouse Electric and Manufacturing Company, which position he occupied until his election as president in 1911.

MR. THOMAS A. EDISON, it is announced, has responded to the invitation of Secretary of the Navy Daniels to head a board of civilian inventors to advise a new branch of the service—the Bureau of Invention and Development. Mr. Edison has been quoted at some length recently with regard to the importance of the United States being thoroughly in touch with inventions which might lead to its supremacy in time of war. The definite plan of organization has not been worked out, but it is understood that Mr. Edison's associates in the new effort will be conspicuous for the contributions already made to the development of American art and industry.

OBITUARY.

MR. BASEL D. CHILDERS, secretary and treasurer of the Childers & Waters Electrical Company, of Louisville, Ky., aged 52, died at a Louisville infirmary after a long illness. He was unmarried and is survived by three brothers, C. C. Childers, president of the company, Henry H. and S. Y. Childers.

CLOSING BID PRICES FOR ELECTRICAL SECURITIES ON THE LEADING EXCHANGES AS COMPARED WITH THE PREVIOUS WEEK.

	July 12	July 5
American Tel. & Tel. (New York)	119¾	120½
Commonwealth Edison (Chicago)	135	135
Edison Electric Illuminating (Boston)	237	237
Electric Storage Battery common (Philadelphia)	52	53¼
Electric Storage Battery preferred (Philadelphia)	52	53¼
General Electric (New York)	161½	168½
Kings County Electric (New York)	119	119
Massachusetts Electric common (Boston)	5	5½
Massachusetts Electric preferred (Boston)	34½	35½
National Carbon common (Chicago)	——	137
National Carbon preferred (Chicago)	120	120
New England Telephone (Boston)	131	129
Philadelphia Electric (Philadelphia)	23¾	23¾
Postal Telegraph and Cables common (New York)	75¾	75
Postal Telegraph and Cables preferred (New York)	64	66¼
Western Union (New York)	65¾	66⅛
Westinghouse common (New York)	97	99⅜
Westinghouse preferred (New York)	122	123¼

MR. EMIL RATHENAU, managing director of the Allgemeine Elektricitäts Gesellschaft, of Berlin, Germany, died recently, at the age of 76. According to the London *Electrician*, "after serving a four years' apprenticeship at the Wilhelmshutte in the mechanical engineering shops, Herr Rathenau finished his training at the Hanover and Zurich Polytechnics. After leaving Zurich he entered Messrs. A. Borsig's locomotive factory at Berlin, and later he came to London, where he entered the firm of John Penn & Son as technical draughtsman. To gain further experience in machine design he subsequently took an appointment with Messrs. Easton, Amos & Sons, and later on joined the staff of the English & Continental Steam Engines Improvement Company. Herr Rathenau returned to Germany in 1865, and, with a friend, bought the mechanical engineering works of M. Webers in Berlin. In this he was very successful, especially during the 1866 and 1870-71 wars, when several contracts were placed with the firm for war material. In 1876 he visited the Philadelphia Exhibition, where he saw the first telephone, but on his return to Germany he was unsuccessful in securing a concession for telephony in Berlin. The Paris Exhibition of 1881, however, incited him to a more successful move, for, having seen Edison's incandescent lighting system, he acquired the German Edison patent rights from the Continental Edison Company, succeeded in interesting rich banking firms in the matter and founded a pioneer company. The latter company developed into the German Edison Company for Applied Electricity, with a capital of five million marks, was formed in 1883, Herr Rathenau being the first director. Out of this company grew the world-famed Allgemeine Elektricitäts Gesellschaft, and also the Berlin Electricity Works, of both of which companies Herr Rathenau has been managing director from the commencement. In July, 1900, the Emperor conferred upon him the title of Geheimer Baurat. Various other honors and distinctions were conferred upon him, including that of officer of the French Legion of Honor, honorary Doctor of Engineering of the Berlin Technical High School, and honorary Doctor of Philosophy of Berlin University."

DATES AHEAD.

Ohio Electric Light Association. Annual convention, Cedar Point, O., July 20-23. Secretary, D. L. Gaskill, Greenville, O.

National Electrical Contractors' Association of the United States. Fifteenth annual convention, San Francisco, Cal., July 21-24. Secretary, George H. Duffield, 41 Martin Building, Utica, N. Y.

American Association for the Advancement of Science. Summer meeting, San Francisco, Cal., August 2-7. Secretary, L. O. Howard, Washington, D. C.

International Association of Municipal Electricians. Annual meeting, Gibson Hotel, Cincinnati, O., August 24-27. Secretary, C. R. George, Houston, Tex.

Indiana Electric Light Association. Annual convention, Hotel Deming, Terre Haute, Ind., September 8-10. Secretary, T. Donahue, La Fayette, Ind.

Pennsylvania Electric Association. Annual convention, Bedford Springs, Pa., September 8-10. Secretary, H. N. Mueller, 435 Sixth Avenue, Pittsburgh, Pa.

Association of Iron and Steel Electrical Engineers. Annual convention, Hotel Statler, Detroit, Mich., September 8-11. Secretary, W. T. Snyder, McKeesport, Pa.

Northwest Section, National Electric Light Association. Annual convention, Portland, Ore., September 8-11. Secretary, N. W. Brockett, Pioneer Building, Seattle, Wash.

New England Section, National Electric Light Association. Annual convention, Mt. Kineo House, Kineo, Me., September 14-17. Secretary, O. A. Bursiel, 149 Tremont Street, Boston, Mass.

American Institute of Electrical Engineers. Panama-Pacific convention, San Francisco, Cal., September 16-18. Secretary, F. L. Hutchinson, 33 West Thirty-ninth Street, New York, N. Y.

American Electrochemical Society. Twenty-eighth general meeting, San Francisco, Cal., September 16-18. Secretary, Joseph W. Richards, South Bethlehem, Pa.

Illuminating Engineering Society. Annual convention, New Willard Hotel, Washington, D. C., September 20-23. Assistant secretary, Joseph Langan, 29 West Thirty-ninth Street, New York, N. Y.

International Engineering Congress, San Francisco, Cal., September 20-25. Executive secretary, E. J. Dupuy, Foxcroft Building, San Francisco, Cal.

Telephone Pioneers of America. Annual meeting, San Francisco, Cal., September 21-23. Secretary, R. H. Starrett, 15 Dey Street, New York, N. Y.

Southeastern Section, National Electric Light Association. Annual convention, Grove Park Inn, Asheville, N. C., September 22-24. Secretary, George H. Wygant, Tampa, Fla.

Colorado Electric Light, Power and Railway Association. Thirteenth annual convention, Glenwood Springs, Colo., September 23, 24 and 25. Secretary, Thomas F. Kennedy, 900 Fifteenth Street, Denver, Colo.

Electric Vehicle Association of America. Annual convention, Cleveland, O., October 18-20. Executive secretary, A. J. Marshall, 29 West Thirty-ninth Street, New York City.

With the Electrical Manufacturers

The Barber-Dwinnell Electric and Manufacturing Company, Kansas City, Mo., has been appointed district sales agent for the Cutler-Hammer Manufacturing Company, Milwaukee, Wis. Territory assigned covers Kansas, Oklahoma, Nebraska and the western portion of Missouri. The company will carry a large stock of starters, controllers and rheostats at Kansas City headquarters.

Royal Electric Manufacturing Company, 556 East Fortieth Street, Chicago, Ill., has ready for distribution a bulletin on its new triple-pole trolley-contact outdoor disconnecting switch. This switch has a distinctive, non-freezing, rolling-wedge contact. It is furnished for a variety of voltages and either with or without chemical fuses, horn-gap lightning arrester, choke coils, and automatic grounding device.

Wheeler Reflector Company, 156 Pearl Street, Boston, Mass., has issued Bulletin R, describing and illustrating Wheeler "Para-Steel" reflectors for industrial lighting with Mazda lamps of the vacuum and gas-filled types. These reflectors are made in a great variety of forms and sizes to suit practically every requirement. Each type is illustrated with one or more views or diagrams.

National Metal Molding Company, Pittsburgh, Pa., has ready for distribution a leaflet that describes and illustrates the use of its No. 377 single and double-clamp bushings. Use of these bushings is required according to the National Electrical Code in making entry of metal molding into various fittings having "twistouts." These bushings serve both to protect the wires and to make a proper connection of the molding and fitting.

The Columbia Products Company, 1012 Garfield Building, Cleveland, O., has assumed the exclusive sale of the whiting and filler formerly handled through the offices of the Columbia Chemical Company and the National Whiting Company. These products will hereafter be known under the trade names of Columbia Whiting and Columbia Filler. These have established a reputation wherever used and the same high standard will be maintained as heretofore.

Hubbard & Company, Pittsburgh, Pa., has ready for distribution circular No. 755, describing its Universal lightning arrester for line or station service on central-station lines of from 500 to 13,200 volts. The company also has available a leaflet on the Hubbard Steelwing anchor; this is a drop-forged steel screw anchor, which, according to the manufacturer, combines dependability with low first cost and low labor cost. Copies of these circulars will be sent to those interested upon request.

The Bristol Company, Waterbury, Conn., has prepared a 24-page booklet (Bulletin 200) giving an illustrated description of its fine exhibit at the Panama-Pacific International Exposition, San Francisco, an account of which appeared in one of our recent issues. Some 40 general and detailed views of the display are shown, giving an excellent idea of the great variety of recording instruments made by the Bristol Company and of some of the characteristics of each. A brief history of the company's development is also given.

The Chelten Electric Company, Incorporated, Philadelphia, Pa., has ready its 1915 catalog of electrical specialties. It describes and illustrates push-button flush switches, lock switches, switch plates, special plates, receptacles and attachment plugs, indicating heater and switch receptacles, sectional switch and conduit boxes and adjustable ground clamps. The catalog is attractively illustrated. A handy freight and parcel-post table is included, also two indexes. The company also has issued in leaflet form a price list of the new Chelten non-arcing inclosed fuses, which are made in a variety of forms and sizes.

Detroit Fuse and Manufacturing Company has let contracts and started work on a new three-story concrete and steel addition to its plant at 1400 Rivard Street, Detroit. The new building will have 35,000 square feet of floor space which will give a total of 60,000 square feet for the manufacture of "Square D" steel-inclosed switches, ironclad fused switches, induction-motor starters and "Arkless" inclosed fuses. This is the second addition made necessary by the company's increased business. The first building was erected in 1909 at 1400 Rivard Street, the first addition being built in 1912. The new building will embody the latest ideas in factory construction, and will be equipped with the most modern machinery obtainable. President Bryson D. Horton, in speaking of the rapid advance the company has made, stated that in June, 1915, the largest month's business in the history of the Detroit Fuse and Manufacturing Company was placed.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has issued bulletin No. 1632 devoted to centrifugal pumps and centrifugal pumping units. This is a 44-page publication containing much valuable information on pumping with centrifugal units, for which electric-motor and steam-turbine drives are peculiarly adapted. The various types of centrifugal pumps manufactured by the company are described and illustrated in great detail. These pumps are made for a great variety of conditions and in each case a type and size that will give the highest possible operating efficiency can be selected. Data and characteristic curves of value in selecting the proper pump are given. Many views are shown of typical installations of centrifugal pumping units, thus giving a good idea of the variety of services for which they can be used; among these services are: boiler feeding, mine pumping, underwriters' fire and city fire service, domestic and city water supply, irrigation, sewage pumping, etc. The cover of the bulletin shows a fire test where twelve high-pressure hose steamers were supplied from a centrifugal pumping station.

The Esterline Company, Indianapolis, Ind., announces that the value of graphic-meter curves is rapidly being appreciated as is evidenced by the fact that the company has just closed a record-breaking month for graphic-meter sales. Amongst others, the following purchased such instruments during June: St. Paul Gas Light Company, St. Paul, Minn., utility wattmeter; Trumbull Electric Manufacturing Company, Plainville, Conn., two wattmeters; Eli Lilly Company, Indianapolis, Ind., ammeter; Pennsylvania Railroad Company, Altoona, Pa., wattmeter; Public Service Commission of Indiana, utility wattmeter and voltmeter; Martien Electric Company, Cleveland, O., three switchboard meters; Northern Electric Company, Toronto, Ont., wattmeter and voltmeter; Terre Haute, Indianapolis & Eastern Traction Company, ammeters; Sears, Roebuck & Company, Chicago, three speed recorders; Electric machinery Company, Minneapolis, Minn., voltmeter; Edison Illuminating Company of Detroit, utility wattmeter; Mechanical Refrigerator Company, Chicago, utility wattmeter; Philadelphia Electric Company, Philadelphia, Pa., two wattmeters; Utah Power & Light Company, Salt Lake City, wattmeter; H. C. Frick Coke Company, Pittsburgh, Pa., two voltmeters, two ammeters and utility wattmeter; Department of Wharves, Docks and Ferries, Philadelphia, Pa., utility wattmeter; Davis Manufacturing Company, Milwaukee, Wis., three wattmeters; Virginia Railway & Power Company, Norfolk, Va., wattmeter; Dodge Brothers, Detroit, Mich., voltmeter and ammeter; Des Moines Electric Company, Des Moines, Iowa, utility wattmeter; Cutler-Hammer Manufacturing Company, Milwaukee, Wis., wattmeter. Many large concerns appreciate the value of these efficiency records, as is proved by the unsolicited repeat orders that have been received from such concerns as Armour & Company, Pacific Portland Cement Company, Des Moines, Electric Company, Springfield Light & Heat Company and the Edison Illuminating Company, of Detroit.

Record of Electrical Patents

Issued by the United States Patent Office, June 22 and 29, 1915.

Prepared by Thomas Howe, Patent Attorney, 2 Rector Street, New York, N. Y.

Patents of June 22, 1915.

1,143,611. Headlight Dimmer. F. G. Christensen and T. W. Fuller, Racine, Wis. Tubular guard may be interposed between lamp and reflector.

1,143,632. Illuminated Clock. H. Kienzle, New York, N. Y. Arrangement of battery and lamp to illuminate dial.

1,143,633. Means for Securing Contacts. C. J. Klein, Milwaukee, Wis. Particular structure of co-operating contact and insulating base.

1,143,650. Non-Glare Reflector. J. F. Scribner, Chicago, Ill. Generally concave reflector has flat center of higher reflection than surrounding parts.

1,143,662. Electric Generator. C. A. Stickney, St. Paul, Minn. Mounted on pump; clutch permits operation by hand or by explosive engine.

1,143,663. Lighting System for Cinematographs. R. Straubel, assignor to firm of Carl Zeiss, Jena, Germany. Arrangement of lenses and cooling chambers in arc-light system.

1,143,664. Self-Winding Electric Clock. U. L. Sundblad, New Haven, Conn. Circuit of motor driving spring barrel controlled by condition of spring and barrel.

1,143,666. Commutator for Dynamo Machines. C. A. Vandervell and A. H. Midgley, Acton Vale, England. Has teeth in the slip ring and commutator segments therebetween and insulated therefrom.

1,143,676. Circuit-Closer. F. Williams, assignor to Acme Register Co., Somerville, Mass. Encased and operated by inserted key.

1,143,680. Telephone System. W. Aitken, Liverpool, England. Line connecting switches manually closed and electromagnetically opened by subscribers.

1,143,682. Apparatus Applicable for Illuminating Cavities or Surfaces. R. Biquard, Paris, France, assignor to himself, to H. Cheron and H. Dominice. Water-jacketed quartz tubes contain electrically illuminating refractory oxides.

1,143,686. Printing-Press Controller. C. E. Carpenter, assignor to Cutler-Hammer Mfg. Co., Milwaukee, Wis. Speed-governing means controlled by feeder clutch.

1,143,722. Photographic Device. H. Van R. Palmer, Dumont, N. J. X-Ray apparatus.

1,143,755. Railway Signaling System. C. F. Dingman, Jersey City, N. J. Block system valve in train pipe opened and light extinguished when a train is in block ahead.

1,143,775. Holder for Lighting Fixtures. N. B. Oppen, Stoughton, Wis. Crow-foot structure.

1,143,799. Receiver for Wireless Telegraphy. R. B. Avery, South Bend, Ind. Has local circuit for the signal instrument energized through step-up transformer. (See cut.)

1,143,806. Headlight. F. Buchanan, Dayton, O. Arrangement of lamps and lenses in combined incandescent and arc light.

1,143,809. Fire-Alarm System. C. F. Christman, Winslow, Ariz. Closing of alarm circuit operates motor-driven air compressor to blow whistle.

1,143,810. Compression Rheostat. E. L. Clark, assignor to National Carbon Co., Cleveland, O. Resistor plates having grooves for passage of cooling fluid.

1,143,818. Charging Storage Batteries. T. A. Edison, West Orange, N. J. For charging signal batteries distributed along railway from vehicle moving along track.

1,143,820. Telephone Trunking System. E. D. Fales, assignor to Automatic Electric Co., Chicago, Ill. Automatic interlocking connecting switches with busy test.

1,143,828. Process for Manufacturing Anodes. P. C. C. Isherwood, Busney Heath, England. From manganese-dioxide ore.

1,143,845. Automobile Horn. R. H. Manson, assignor to Garford Mfg. Co., Elyria, O. Duplex push-button for operating.

1,143,869. Electric Time Switch. A. W. Voedisch, Aberdeen, S. D. Particular structure for controlling switch by time element.

1,143,874. Trolley Retriever or Safety Device. M. A. Yeakley, assignor to J. E. McLain, Canton, O. Spring device is locked against rotation according to whether or not rope is attached.

1,143,875. Trolley Retriever. M. A. Yeakley, assignor to J. E. McLain. Drum has variable power connections with operating spring.

1,143,876. Snap Electric-Light Switch. J. Yuill, Toronto, Canada, assignor of one-third to W. H. T. Stevens, and one-third to L. Rahne. Rotary; frictionally held closed and retarded spring opening means.

1,143,880. Trolley Wheel. J. W. Anderson, assignor to American Trolley Wheel Co., Buffalo, N. Y. Improved lubricating structure.

1,143,883. Electric Stove. R. F. Boettiger, Aberdeen, Wash. Particular structure of heating plate and resistor.

1,143,909. Metallic-Filament Lamp. H. J. Jaeger, Weehawken, N. J. Conically coiled tungsten filament.

1,143,916. Method of Making Pipes for Electrical Conduits. N. H. Raymond, assignor to Clifton Mfg. Co., Boston, Mass. Scale, etc., loosened by hammering and oxide, etc., removed by sand blast.

1,143,937. Snap Lock for Electric-Socket Shells. T. A. C. Both, assignor to Zee Socket & Mfg. Co., Boston, Mass. Locking ring in cap expands and locks to cap upon insertion of shell.

1,143,940. Electric Furnace. J. W. Brown, assignor to National Carbon Co. Has condensing chamber into which volatilized impurities are drawn.

1,143,948. Control System for Gun Mountings and Other Mechanism. A. T. Dawson and J. Horne, assignors to Vickers Limited, Westminster, England. Power-driven mechanism distantly controlled.

1,143,955. Control System for Electric Motors. A. J. Hall, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Switch electromagnetically tripped in response to current conditions, has electromagnetic reset.

1,143,956. Control System for Electric Motors. A. J. Hall and L. G. Riley, assignors to Westinghouse Electric & Mfg. Co. Electromagnetic means for automatically adding parallel resistances in motor circuit during period of locomotive acceleration.

1,143,963. Universal Load Box. J. L. Herman, Fort Wayne, Ind. For testing meters; has primary and secondaries of different load capacities and ranges of power-factor.

1,143,966. Flashlight. H. T. Hipwell, Pittsburgh, Pa. Special arrangement of lenses, reflector and lamp in familiar tubular form.

1,143,969. Circuit-Controlling Element. C. H. Kayser, assignor to Ideal Fire Detector Co., West Orange, N. J. For fire-alarm systems; circuit connections operated by expanded air in closed chamber.

1,143,970. Fire Detector Apparatus. C. H. Kayser and W. H. Hampton, assignors to Ideal Fire Detector Co. Different structure for carrying out same operations as above.

1,143,978. Speedometer. W. G. Leathers, assignor to Stewart-Warner Speedometer Corporation, Chicago, Ill. Drive shaft magnetically drives member having flexible connection with retarded rotatable indicator.

1,143,983. Insulator Support. C. E. Miller, Pittsburgh, Pa. Wire spiral forms threaded top of supporting pin.

1,143,998. Line Switch. J. G. Roberts, assignor to Western Electric Co., New York, N. Y. Sets of bars transverse to each other co-operate to operate contacts at their intersections.

1,144,011. Power-Transmission Mechanism. J. G. P. Thomas, Holywell, Wales. Electromechanical connection.

1,144,012. Speed-Controlling Device. A. Walton, assignor to Westinghouse Electric & Mfg. Co. Motor has single rotor and two automatically adjustable stator members.

1,144,016. Magneto Driving Mechanism. J. A. Williams, assignor to K. W. Ignition Co., Cleveland, Ohio. Spring driving connection for momentarily increasing speed of armature over driving shaft.

1,144,017. Railway-Traffic-Controlling Apparatus. W. P. Allen and G. R. Scattergood, assignors to Union Switch & Signal Co., Swissvale, Pa. Electric block system.

1,144,028 and 1,144,029. Protective Device. E. E. F. Creighton, assignor to General Electric Co., Schenectady, N. Y. First patent, arrester spark gap in partially evacuated chamber having gas at pressure greater than critical but making equivalent needle gap substantially minimum. Second patent, modification.

1,144,032. Automatic Temperature-Regulating System. H. G. Geissinger, assignor to Geissinger Regulator Co., New York, N. Y. Air heating electrically controlled by thermostat.

1,144,034. Process for the Treatment of Steel. F. Giolitti, assignor to Societa Anonima Italiana Gio. Ansaldo & C., Genoa, Italy. Piping prevented by cooling ingot from bottom upward, upper part being kept liquid by electric currents induced in it.

1,144,038. Electric Switch. E. H. Jacobs, assignor to General Electric Co. Lever-operated inclosed switch with spring connection for quick movement.

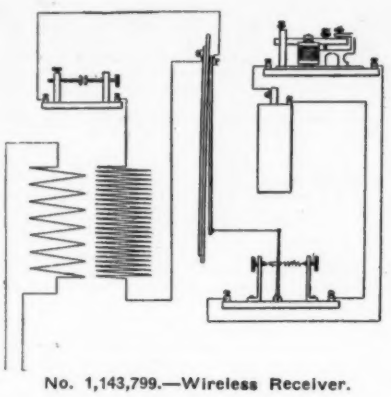
1,144,047. Electric Switch. E. B. Merriam, assignor to General Electric Co. Contacts in compressed insulating gas.

1,144,051. Game Apparatus. K. Okamoto, San Francisco, Cal. Electric lamps controlled by contacts in ball runways.

1,144,063. Magnetically Operated Device. C. H. Rippl, assignor to Electric Controller & Mfg. Co., Cleveland, O. Electromagnet with armature having rolling motion about longitudinal axis eccentric to the supporting means.

1,144,084. Call-Distributing System. C. S. Winston, assignor to Kellogg Switchboard & Supply Co., Chicago, Ill. Automatic selection of idle operators' cords.

1,144,087. Adjustable Holder for Pocket Electric Lamps. DeW. S. Adler, assignor to The Metalyte Co., New York, N. Y. For usual tubular pocket flashlight.



No. 1,143,799.—Wireless Receiver.

1,144,095. Support for Indirect or Semi-Indirect Lighting Fixtures. H. A. Bauer, Lansdowne, Pa. Arrangement of bowl and pull sockets with provision for drop light.

1,144,097. Starter for Gas Engines. V. Bendix, Memphis, Tenn. Automatic gearing between starting motor and engine shaft.

1,144,101. Safety Device for Gasoline Motors. R. J. Bradbury, Denver, Colo., assignor of two-fifths to A. Jackson. Electric lights indicate level of oil in crank case.

1,144,107. Switch Plate. W. H. Burt, assignor to Waterbury Mfg. Co., Waterbury, Conn. Particular hinge construction for double doors.

1,144,114. Process of Mounting Metallic Filaments on Filament-Carriers of Incandescent Lamps. O. Feuerlein and M. Von Pirani, assignors to General Electric Co. Filaments tensioned by rigid means and expanded by passing electric current, then mounted on pliable holders.

1,144,135. Ignition Timer. W. Kaisling, assignor to Kellogg Switchboard & Supply Co. Contact element on shaft can be adjusted while shaft rotates.

1,144,149. Alternating-Current System. L. C. Marburg, assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. Stores and returns energy to variably loaded circuit.

1,144,153. Insulator. W. H. Nichols, Bennington, Vt. Structure of cleat.

1,144,167, 1,144,168 and 1,144,169. Means for Controlling the Operation of Gas Retorts. H. A. Carpenter and A. W. Warner, assignors to Riter-Conley Mfg. Co., Pittsburgh, Pa. Circuit of motor-operated retort tools controlled by retort closure.

1,144,172. Combined Dash Light, Trouble Light and Cigar Lighter. W. H. Collier, Nashville, Tenn. Conductors wound on reel permit movement of lamp to different points.

1,144,201. Portable Flashlight. H. H. Hipwell and H. T. Hipwell, Pittsburgh, Pa. Particular structure of tubular pocket type.

1,144,210. Tool. R. Kincaid, Youngstown, O. Dry cell and lamp in handle to illuminate work.

1,144,224. Cable Tap. C. B. Mills, Baltimore, Md., assignor of one-fourth to A. J. Carr. Structure having conductors and insulators arranged to tap conductors and insulate joint.

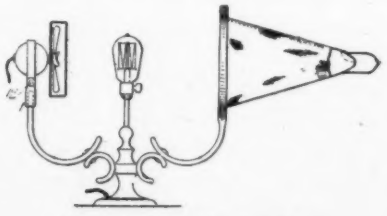
1,144,225. Cable-Connector. C. B. Mills, assignor of one-fourth to A. J. Carr. Same object in structure connecting cable ends.

1,144,226. Electroplating Process. C. B. Mills, Baltimore, Md. For electroplating non-metallic substances.

1,144,233. Time-Limit Circuit-Breaker. M. F. Owens, assignor to Automatic Refrigerating Co., Hartford, Conn. Automatically locks for predetermined time to permit starting of motor.

1,144,236. Transmitter or Reproducer. W. E. Peirce, San Francisco, Cal. Telegraphic contactor operated by embossed tape.

1,144,246. Driving of Vehicles. J. Rebstein, assignor to Brown, Boveri & Cie, Baden, Switzerland. Counterweighted cranks for locomotive driving motors.



No. 1,144,358.—Fly Catcher.

1,144,252. Electrical Conductor. L. Roebel, assignor to Brown, Boveri & Cie. Particular structure and arrangement of strips to prevent deleterious induction within conductor.

1,144,255. Electric Testing Instrument. H. Schade, Albany, N. Y. Arrangement for testing lamps, fuses and batteries.

1,144,264. Controlling System for Electrical Apparatus. S. K. Thompson, Jenkintown, Pa. Charging set for batteries started at will and automatically stopped.

1,144,271. Apparatus for the Continuous Production by Synthesis of Hydrogen Peroxid. W. Weber, assignor to Henkel & Cie, Dusseldorf, Germany. High-pressure metallic vessel, coated inside with cathode material, surrounds anode covered with diaphragm.

1,144,281. Process of Making Terminals. H. B. Andrews, assignor to H. B. Sherman Mfg. Co., Battle Creek, Mich. Metal terminal lug for cable.

1,144,290. Telegraphy. B. L. Bobroff, assignor to Universal Indicator Co., Milwaukee, Wis. Structure of dial telegraph.

1,144,299. Electric Regulation. J. L. Creveling, assignor to Safety Car Heating & Lighting Co., New York, N. Y. Automatic, electromagnetically operated, compression resistance.

1,144,311. Storage-Battery Element and Method of Making the Same. J. Redding, Malden, Mass., assignor of one-half to E. Parker. Electrolytically depositing lead and alkaline metal on support and hydrating and removing alkaline metal, leaving spongy lead.

1,144,318. Cable Hanger. J. Blackburn, Webster Groves, Mo. For suspending from messenger.

1,144,330. Telephone Busy-Signal Apparatus. G. E. Kimball, assignor to First Trust & Savings Bank, Chicago, Ill. Buzzer in signal circuit which is opened periodically by relay.

1,144,335. Excess Indicator. H. O. Swoboda, assignor to Excess Indicator Co., Edgewood, Pa. Device for flickering and dimming on excess current.

1,144,339. Means for Synchronously Displaying Cinematographic Pictures and Reproducing Sound. L. Gaumont, assignor to Societe des Etablissements Gaumont, Paris, France. Synchronism indicator operated by phonograph and motion-picture machine located distantly from each other, through electric transmission.

Electrical Patents of June 29, 1915.

1,144,350. Electric Welding. E. F. Collins, assignor to General Electric Co., Schenectady, N. Y. Two members of different heat-radiating and conducting capacities joined by a third member.

1,144,351. Dynamo-Electric Machine. E. F. Collins, assignor to General Electric Co. Joining of bars to end rings in short-circuited winding.

1,144,354. Storage-Battery Charging System. F. E. Fanning, Woodland, Ill. Arrangement for cutting generator in and out on battery and light feeders.

1,144,358. Insect-Capturing Apparatus. K. G. Gyllstrom, Richmond Hill, N. Y. Electric light attracts and fan blows insects into trap. (See cut.)

1,144,362. Film-Winding Apparatus. F. L. Kempff and H. W. Smith, assignors of three-eighths to F. O. Horting and three-eighths to M. W. Pickens, Harrisburg, Pa., and one-fourth to said Kempff. Brake for paying-out reel controls motor driving take-up reel.

1,144,383. Magnetic Separating Apparatus. E. H. Rothert, Leavenworth, Wash. Material subjected successively to action of plurality of separator belts.

1,144,388. Motor Controller and Indicator. F. W. Smith, assignor to Sundh Electric Co., New York, N. Y. Shows on what resistance step motor is operating.

1,144,390. Electric Welding and Fusion Deposition of Metals. A. P. Strohmenger, assignor to Slaughter & Co., London, England. Electrode has metal core with aluminum wire along side and insulating covering about all.

1,144,391. Transmitter for Telephone and Other Sound-Transmitting Instruments. W. P. Stunz, Lansdowne, Md., assignor to Webb Talking Pictures Co. Has plurality of granule chambers and electrodes acted on by diaphragm.

1,144,396. Starter for Vapor-Electric Devices. P. H. Thomas, assignor to Cooper Hewitt Electric Co., Hoboken, N. J. Incandescent filament supplements the spectrum of the mercury vapor.

1,144,399. Rectifying Detector for Wireless Systems. E. T. Turney, New York, N. Y. Has two contact elements, one adapted to rectify alternating current and the other is finely divided conductor.

1,144,401. Magneto Cord Circuit With Secret Service. R. I. Utter and H. P. Schmidt,

assignors to Kellogg Switchboard & Supply Co., Chicago, Ill. Plug seat switches connect operator's telephone with cord on removal of answering plug and disconnect upon removal of calling plug.

1,144,407. Telephone System. A. H. Dyson, assignor to Kellogg Switchboard & Supply Co. Automatic switch connects subscriber with idle link circuit and places control of restoration with subscriber, if all links are busy.

1,144,419. Electric Switch. C. J. Klein, assignor to Cutler-Hammer Mfg Co., Milwaukee, Wis. Oscillating pivoted contact member operated by opposed push buttons.

1,144,427. Gas Control Valve and Igniter. C. J. Muehlmann, Detroit, Mich. Interrelation of gas valves and electric sparking ignition in gas lights.

1,144,431. Motor Controller. G. R. Radley, assignor to Cutler-Hammer Mfg. Co. Series-parallel control of series-field windings effected without opening motor circuit.

1,144,438. Electric Starter for Automobile Engines. A. W. Smith, Washington, D. C. Motor-driven roller engages flywheel and is pressed thereagainst by magnetism of motor field.

1,144,465. Railway - Traffic - Controlling System. A. V. T. Day, assignor to Hall Switch & Signal Co., New York, N. Y. Normal-danger, block-signal system.

1,144,466. Egg-Tester. F. W. Dobbel, Sonoma, Cal. Arrangement of lamp, mounting and shade.

1,144,479. Safety Device for Elevators. J. A. Keyes, New York, N. Y. Electric door lock controlled by operator and door.

1,144,491. Mechanism for Insuring Understanding of Signals from Bridge to Engine Room. W. Michael, assignor to Union Iron Works Co., San Francisco, Cal. Engine reverse lever electromagnetically locked against movement in wrong direction.

1,144,508. Humidor. J. Taylor, Jr., Kansas City, Mo. Water warmed by electric lamp to supply moisture.

1,144,509. Railway Signaling. J. D. Taylor, assignor to Union Switch & Signal Co., Swissvale, Pa. On single track, separate sets of signals govern traffic in opposite directions.

1,144,517. Junction Box. P. J. Wittenberg, assignor of one-third to C. E. Downing and one-third to J. Aaron, Chicago, Ill. Sheet-metal box adapted for use in molded concrete walls.

1,144,538. Electrolytic Apparatus. W. E. Greenawalt, Denver, Colo. Tank divided into anode and cathode compartments has reciprocating cathode and anode composed of rotating rods.

1,144,552. Steering Apparatus. H. A. Lardner and G. F. Chellis, San Francisco, Cal. Steering rod rotated by special electric motor.

1,144,560. Indicating System. E. C. Molina, assignor to American Telephone & Telegraph Co., New York, N. Y. For displaying telephone-line designation, characters are selected by one system of impulses and displayed by another.

1,144,593. Pipe and Cable Hanger. J. B. Heiser, Williamsport, Pa. Transversely adjustable, for securing to I-beams.

1,144,595. Process for Manufacturing Incandescent Filaments. R. H. Henderson, assignor to Westinghouse Lamp Co., Pittsburgh, Pa. Filament material successively passed through chambers in which it receives different degrees of heat and chemical treatment.

1,144,596. Method of and Apparatus for Translating Electrical Variations. P. C. Hewitt, assignor to Cooper Hewitt Electric Co., Hoboken, N. J. Wireless system wherein signal waves are imposed on vapor conductor carrying independent current.

1,144,604. Voltage Regulator. E. Lehr, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Alternating-current induction regulator.

1,144,605. Annunciator. O. M. Leich, Genoa, Ill., assignor to Craecraft, Leich Electric Co., Genoa, Ill. For telephone switchboard; has two signals under its control.

1,144,614. Electric Sadiron. E. E. Rose, assignor to Westinghouse Electric & Mfg. Co. Details.

1,144,618. Winding Head. W. F. Smith, assignor to Western Electric Co., New York, N. Y. For winding insulating tape on wire.

1,144,620. Overhead Line Construction. N. W. Storer, assignor to Westinghouse Electric & Mfg. Co. For tunnels; arms extend in both directions from center and support messenger wires to which the trolley wires are secured.

1,144,627. Adjustable Bearing for Dynamo-Electric Machines. R. B. Williamson, assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. Arrangement of bearing sleeves, bushings and housings.

1,144,628. Battery Plate. A. S. Atwater and D. F. Selzer, Cleveland, O. Planté plate made porous by insertion in interior of swaged Z-shaped partitions.

1,144,629. Adjustable Sign and Lighting Post. G. Auer, White Plains, N. Y. Cast concrete post with sign arm, lamp at top and conductor conduits.

1,144,636. Electrical Measuring Instrument. P. A. Campbell, assignor to Westinghouse Lamp Co. Structure and arrangement of terminal devices.

1,144,648. Electric Apparatus. C. LeG. Fortescue, assignor to Westinghouse Electric & Mfg. Co. Hollow insulating bushing in transformer casing has oil sucked into it by exhausting its air.

1,144,656. Flashlight Attachment for Guns. J. P. Hise and W. H. Moyers, Hightown, Va. Flashlight tube pivotally mounted on gun barrel.

1,144,672. Fused Test Clamp Insulator. G. Wheale, Meadowbrook, Pa. Pole insulator has separated terminal rings for wires and fuse between rings.

1,144,673. Advertising Device. W. B. Wheeler, Long Beach, Cal., assignor of one-half to R. S. Gilman. Driving connections of motor with reels of display ribbon controlled by timing device and ribbon.

1,144,676. Headlight. R. F. Wilson, Denver, Colo. Concave reflector has at rear two incandescent filaments, one above the other, and shield below upper to shut off rays from lower part of reflector.

1,144,680. Electroplating Apparatus. H. G. Allers, Buffalo, N. Y. Arrangement of tanks and anodes.

1,144,688. Thermoelectric Pyrometer System. R. P. Brown, Philadelphia, Pa. Main and auxiliary couples connected with indicator have their cold and hot junctions, respectively, in chamber of constant temperature.

1,144,705. Portable Electric Automatic Sawing Machine. W. Gralapp, Wittenberg, Wis. Relates to details of mechanical structure.

1,144,732. Fuse Device. E. O. Schweitzer and A. Herz, Chicago, Ill. Fuse compressed in cavity in block when softened and arc prevented.

1,144,745. Relay. S. E. Witt, assignor to Automatic Electric Co., Chicago, Ill. Structural details of armature.

1,144,748. Horological Motor. B. A. Adler, assignor of one-half to P. A. Lorenz, Chicago, Ill. Electrically controlled pawl and wheel mechanism for clock.

1,144,752. Vehicle Drive Mechanism. W. E. Bock, Toledo, O. Gearing and mounting of motor armature.

1,144,776. Method of and Means for Measuring Temperature and Resistivity. E. F. Northrup, Princeton, N. J. Pyrometer method; tin is subjected to temperature and resistance measured.

1,144,781. Plug Switch. F. J. Ravlin and J. Lofgren, Chicago, Ill. Details of a plural circuit structure.

1,144,800. Apparatus for Manufacturing Carbureted Hydrogen Gas. B. Van Steenbergh, Goshen, N. Y. Electrically heated generator.

1,144,801. Electric Heater. B. Van Steenbergh. Insulating tube filled with resistance particles, has electrodes at ends and exterior coating of catalytic agent.

1,144,809. Electrically Heated Stenciling Machine. E. N. Chandler, Braintree, Mass. Vertical reciprocating carrier has electric heating means.

1,144,815. Magneto for Use on Internal-Combustion Engines. J. A. Cole, Leamington, England. Comprises contact-breaker and grounding connection.

1,144,834. Pressure Drop Alarm for Tires. F. P. Freeman, Richland, Wash. Electric alarm sounded by device on inflating stem when pressure drops.

1,144,843. Annunciator. L. C. Hodson, Winnipeg, Man., Canada. Details.

1,144,870. Code-Signal Device. A. L. Sohm, assignor to Sohm Electric Signal & Recording Co., Chicago, Ill. Signal coded by setting up pins in sockets in a metal drum, contacts being made by the pins as drum is turned.

1,144,871. Weatherproof Annunciator Case. A. Stern, Yonkers, and P. K. Stern, New York, N. Y. Details of structure of case.

1,144,872. Controller. A. Stern, Yonkers, N. Y. Particular structure of make-and-break type.

1,144,873. Signaling System. A. Stern and P. K. Stern. Automobile-direction annunciator exhibits different colored signs and with each sign a lamp of the same color is lighted.

1,144,876. Starting Box. M. Taigman, New York, N. Y. Resistance box for mounting on ceiling and operated by depending rod.

1,144,895. Electric Clock System. L. J. Aron, assignor to X. L. Electric Co., London, England. Master clock periodically closes circuit and reverses polarity to operate secondary clocks.

1,144,898. Fault-Finder for Internal-Combustion Engine. D. P. F. Ghadiali, New York, N. Y. Duplex visual indicator, connected to spark plug, comprises a sparking tube and a glow tube.

1,144,903. Motor-Vehicle Signal. E. B. Hopkins, Savannah, Ga. Foot-controlled shutter for tail light and signal circuit controlled by said shutter.

1,144,935. Machine-Tool Control. A. L. DeLeeuw, assignor to Cincinnati Milling Machine Co., Cincinnati, O. High-speed electric motor and low-speed mechanical drive alternately connected by electromagnetic clutch controlled by traveling work support in planers, shapers, etc.

1,144,941. Microscope Warm Stage. T. Lidberg, assignor of one-half to J. W. Morsbach, Chicago, Ill. Electrically heated, thermostatically controlled.

1,144,942. Incubator for Microscope Stages. T. Lidberg, Chicago, assignor of one-half to J. W. Morsbach. Constant temperature automatically maintained in electrically heated chamber.

1,144,946. Weft-Replenishing Loom. E. H. Ryon, assignor to Crompton & Knowles Loom Works, Waltham, Mass. Circuit of magnet controlling weft-replenishing mechanism closed when filling in active shuttle is exhausted.

1,144,948. Metal-Armor Circuit-Connecting Attachment. J. C. Stearns, Worcester, Mass. Outer casing incloses insulating block in which conductor ends are securely fastened and protected.

1,144,949. Electrical Fitting. J. C. Stearns. Tubular connector receiving lamp at one end and plug at other has rotatable insulating block for making and breaking connections.

1,144,954. Electric Hot-Water Heating System. W. L. Waters, Milwaukee, Wis. Water-heating jacket about stove has water further heated by electric heater immersed therein.

1,144,956. Lamp Socket. H. Aiken, assignor to Aiken Lamp Co., Franklin, N. H. Horizontal supporting arm has headlight frame rotatable about it and a lamp body is rotatably adjustable about vertical axis.

1,144,969. Radiotelegraphy and Telephony Receiver. G. W. Pickard, Amesbury, Mass. Received waves produce currents of two frequencies, producing beats of audible frequency; pick-up coil and sound-producer actuated by the beats.

1,144,973. Electric Apparatus for Driving Clocks or Similar Mechanism. H. E. Warren, assignor to Warren Clock Co., Portland, Me. Amplitude regulating circuit-closer closed at varying intervals according to swing of pendulum.

1,144,981. Electric Heater. E. N. Lightfoot, New York, N. Y. Number of heating coils in operation controlled by object placed in heating chamber.

Patents Expired.

The following United States electrical patents expired on July 12, 1915:

607,005. Apparatus for Manufacturing Ozone. E. Andreote, London, England.

607,018. Underground Electric Conduit. T. Connelly, Chicago, Ill.

607,036 Electric Controlling Apparatus for Switch Valves. E. G. Harris, Rolla, Mo.

607,070. Electric Cable for Driving Conveyances. A. Norman, Toronto, Canada.

607,078. Electrode Plate of Electric Accumulators. P. F. Ribbe, Berlin, Germany.

607,093. Electrically Heated Roll. F. P. Snow, Lynn, Mass.

607,124. Automatic Cutout for Secondary Batteries. W. L. Negbaur, Brookline, Mass.

607,125. Method of and Apparatus for Generating Electricity. W. L. Negbaur, Brookline, and J. J. Feely, Walpole, Mass.

607,176. Electric Break for Induction Coils. T. B. Kinraide, Boston, Mass.

607,177. Electric Break and Induction Apparatus. T. B. Kinraide.

607,185. Electric Meter. W. D. Marks, Philadelphia, Pa.

607,194. Trolley. W. H. Russell, Chicago, Ill.

607,233. X-Ray Apparatus. H. Green, Hartford, Conn.

607,239. Telegraph. L. W. Hildburgh, New York, N. Y.

607,247. Electric Motor. W. S. Johnson and H. Winkenworder, Milwaukee, Wis.

607,250. Electric Cutout. H. A. Lewis, Norristown, Pa.

607,251. Fuse Holder, Circuit Breaker and Lightning Arrester. H. A. Lewis.

607,302. Electric Locomotive. H. Van Hoevenbergh, New York, N. Y.

607,311. Electric Current Controller. E. E. Werner, Philadelphia, Pa.

607,315. Insulator. C. L. Wingard, Walla Walla, Wash.

607,343. Switchboard and Alarm Mechanism. J. P. Conway, New York, N. Y.

607,351. Electric Railway. W. W. Doty and C. Grauten, New York, and J. A. MacKnight, Mount Vernon, N. Y.

607,387. Trolley for Electric Railways. H. Van Hoevenbergh, New York, N. Y.

607,407. Alarm System. C. Coleman, Chicago, Ill.